Attachment C

Evaluation of Stratigraphy above the E-Clay Tulare Lake Bed MUN/AGR De-Designation Area (including CD)

TECHNICAL MEMORANDUM



EVALUATION OF STRATIGRAPHY ABOVE THE E-CLAY TULARE LAKE BED AREA MUN/AGR DE-DESIGNATION

Prepared for: Tulare Lake Basin Water Storage District

Tulare Lake Drainage District

Date: November 21, 2014

1. Background

Under Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) and requirements for completion of Central Valley Salt and Nitrate Management Plans, a portion of the Tulare Lake Bed groundwater basin was identified as an area that may meet exemption criteria set forth in the state's Safe Drinking Water Policy (SDWP), Resolution No. 88-63. Through CV-SALTS, a report was submitted to the Regional Water Quality Control Board, Central Valley Region, by the Tulare Lake Drainage District (TLDD) and Tulare Lake Basin Water Storage District (TLBWSD) providing a technical basis for de-designation, or delisting, of municipal or domestic (MUN) and agricultural (AGR) beneficial uses from the portion of the Tulare lake Groundwater Subbasin (Department of Water Resources Bulletin 118 2003 Update, Subbasin 5-22.12) that underlies the Tulare Lake Bed. The report, entitled Technical and Regulatory Evaluation of MUN and AGR Beneficial Uses in the Tulare Lake Bed Area, February 12, 2014, was prepared by Kenneth D. Schmidt and Associates (KDSA) with regulatory and technical analysis by CDM Smith and Summers Engineering. Informal comments on this technical report were made by the Central Valley Water Board dated May 12, 2014. Figure 1a is a location map showing original and recommended horizontal delisting boundaries for the Tulare Lake Bed area by KDSA (2014); Figure 1b shows the KDSA study subareas. On all figures for the current technical memorandum, the historic lake bed outline is shown and based on an 1873 compilation from the Maps of the Geological Survey of California and Special Survey and Examinations (see references).

The SDWP specifies that all surface and ground waters of the state are considered suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Boards. The KDSA (2014) report evaluates and proposes delisting boundaries using exceptions under the SDWP meeting the following two criteria applicable to groundwater. The exceptions are:

1. Surface and ground waters where:

a. The total dissolved solids (TDS) exceed 3,000 mg/L (5,000 µS/cm, electrical conductivity) and it is not reasonably expected by Regional Boards to supply a public water system, or

b. There is contamination, either by natural processes or by human activity (unrelated to the specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices...

The KDSA (2014) study area was based on an initial delineation of horizontal boundaries encompassing the Tulare Lake Bed as distinguishable by its topography, flooding susceptibility, soil and groundwater characteristics, and geologic features. The area was subdivided into subareas consisting of a Central Subarea absent of water supply sources and predominated by thick clay beds, and North, South, West, and East subareas along the fringes where some development of groundwater supply occurs, notably for cities and small communities as well as agricultural uses (see **Figure 1b**).

The KDSA (2014) evaluation provided a recommended horizontal delisting boundary. The vertical limits correspond to the occurrence of the A-Clay. The A-Clay is the uppermost lacustrine deposit outlined by Croft and Gordon (1968) in a descending sequence of older lacustrine deposits termed A-F Clays.

2. Purpose of Current Technical Memorandum

The current technical memorandum was prepared to supplement the evaluation by KDSA (2014) and support horizontal and vertical delineation of MUN and AGR boundaries in the Tulare Lake Bed area. The current work also addresses informally transmitted comments by the Central Valley Regional Board on May 12, 2014, which consisted of eight technical issues calling for better support for the proposed delisting. Issues 2 and 3 in the Board's comments related to insufficient delineation of horizontal and vertical delisting boundaries. Under Issue 2, the Board noted that sedimentary deposits depicted in geologic cross sections did not correspond to specific horizontal boundaries and that pumping adjacent to the recommended boundary could induce groundwater flow from delisted areas. Under Issue 3, the Board noted that the recommended A-Clay vertical delisting boundary is not present at all locations within the study area and, where present, cannot always be distinguished from other clays.

The current technical memorandum supports the KDSA (2014) boundary recommendations through a detailed stratigraphic interpretation using additional well control not available at the time of the study.

3. Method

The current evaluation is based on examination of well logs and construction of geologic cross sections to develop stratigraphic relationships and limits of sand units that might serve MUN and AGR beneficial uses in the area. A detailed representative cross section was produced to show these relationships and is presented in this technical memorandum. The cross section depicts conditions in the KDSA (2014) North and East subareas and extends into the Central Subarea, which is known for the occurrence of thick lacustrine clay units. Sources of well logs were KDSA (2014), recent geophysical logs (e-logs) from boreholes in the northern Tulare Lake Bed area, and oil and gas logs obtained from the state Division of Oil, Gas and Geothermal

Resources. The recent e-logs significantly improved correlation of sand beds that potentially require protection under the SDWP. **Figure 2** shows the delisting boundaries and well control from KDSA (2014), plus recent e-logs and additional oil and gas logs used in the current evaluation. The recent e-logs used are attached for reference (see enclosed **Logs**). Additional oil and gas well logs that were not part of the KDSA (2014) report are included on electronic disk.

4. Discussion of Results

The stratigraphic evaluation within the original and recommended delisting areas delineated by KDSA (2014) is presented in the following sections. The evaluation focuses on the occurrence and distribution of sand units above the E-Clay as a basis for defining limits of potential water supply sources. The first section discusses the Tulare Lake Bed lacustrine clay units, including the E-Clay, to frame the subsequent discussion of interbedded sands at the Lake Bed fringes that are potential beneficial water supply sources.

4.1 Lacustrine Clay Units

The presence of lacustrine clay units in the San Joaquin Valley has been known since the early 1900s. The most wide-spread and distinctive unit was initially termed the Corcoran Clay of the Tulare Formation and is present in the subsurface beneath most of the western and central parts of the San Joaquin Valley. Early groundwater studies near the Tulare Lake Bed delineated the Corcoran diatomaceous clay (Davis and Poland, 1957; Wood and Davis, 1959). Croft and Gordon (1968) delineated the lacustrine clay beds in the Hanford-Visalia area encompassing the northern area of the Tulare Lake Bed. Their study defined the lacustrine/marsh beds in a descending sequence of A to F clays. The E-Clay was in part equivalent to the Corcoran Clay member of the Tulare Formation of the earlier studies.

Croft and Gordon (1968) mapped the extent of the lacustrine clays (A-F) in the Hanford-Visalia area showing structure contour elevations on the top or bottom of each clay unit. Their cross-sections A-A' and B-B' show inter-fingering and pinching out of sand beds into the thick lacustrine clay beds beneath the Tulare Lake Bed corresponding to the Central Subarea by KDSA (2014) and this evaluation. The Croft and Gordon (1968) cross sections and structure contour map show a lack of distinction between the A-F units in this area where the lacustrine clays extend up to 3,000 feet in depth.

In a study of the entire southern San Joaquin Valley, Croft (1972) expanded the A-F lacustrine clays across a larger area with cross-sections C-C' and G-G' showing adjacent sand units interfingering and pinching out into the undifferentiated thick lacustrine clays above the E-Clay unit. Croft (1972) also presented structure contour maps on the A-, C-, and E-Clays in the southern San Joaquin study area. Subsequently, a study of the entire Central Valley by Page (1986) showed similar inter-fingering and pinch-out patterns of the sand units with the lacustrine clay beneath the Tulare Lake Bed.

Consistent with previous studies, the current evaluation found that the more distant from the lake margins, the more difficult it is to distinguish stratigraphic horizons using geophysical logs. Within the thick, very low resistivity lacustrine clay sequence, only the E-Clay unit could

reliably be identified and correlated. As discussed below, the gamma ray curve may provide a means to correlate and separate the lacustrine clay units, but control is too limited for extensive mapping.

4.2 Occurrence of Sands above the E-Clay

Recent e-logs from boreholes located mainly in the south half of Township 21 North, Ranges 21 and 22 East, and the north half of Township 22 North, Range 22 East were examined for stratigraphic markers and correlations (see **Figure 2**). This area includes the vicinity of the City of Corcoran and corresponds to parts of the North and East Subareas evaluated by KDSA (2014).

Supplemented with older geophysical logs and drillers reports from water wells and oil and gas boreholes, geological cross sections were constructed in the northern Tulare Lake Bed area to generally assess occurrence and patterns of geologic units that may either isolate or interconnect groundwater sources, which is of concern in the delisting process. The work focused on the geologic relationships above the E-Clay. Although in most areas there are no water supply wells completed above the E-Clay, wells targeting deeper freshwater sands provided e-logs that permitted delineation of features above the unit.

The central portion of the Tulare Lake Bed area is characterized by up to 3,000 feet of clay formation with indistinguishable features on electric geophysical logs. As noted by KDSA (2014), sands occur along the fringes in the North and East study subareas, which may provide sources of supply under MUN and AGR beneficial uses and would need to be excluded from the delisting boundaries. This investigation identified sands in these areas from recent geophysical logs, which are informally termed as the 'V' Sequence or 'V' Sands, to delineate their interpreted stratigraphic relationship. These sands are interbedded with the lacustrine clay units described above.

4.3 Evaluation of 'V' Sequence

The evaluation of the 'V' Sequence consisted of detailed review of recent e-logs and selected older e-logs to construct structure maps and geologic cross sections. A representative cross section extends over eight miles in the KDSA (2014) North and East subareas. The east-west cross section reflects geophysical characteristics of geologic beds to a depth of about 800 feet, or -600 feet elevation. The alignment of the representative cross section was selected to reflect the depositional environments from the northern and eastern fringes into the central part of the Lake Bed.

Stratigraphic correlations were determined from e-logs based on the nature, character and variation of geophysical signatures for geologic beds encountered in boreholes. Observations were made on the thickness and number of beds. The representative Cross Section X-X' is shown on **Figure 3**. The location and well control for this cross section is shown on **Figure 4**. For each well on the cross section, the 16-inch normal resistivity curve (short normal) from the geophysical log is reproduced based on a normalization to an original drawing scale of 0.10 inch to 10 ohm-meter²/meter (the shorthand "ohms" is used to express resistivity values in this technical memorandum). In general, higher resistivity values represent coarse-grained, sedimentary geologic material of sands and gravels, with the lowest resistivity values

representing fine-grained, sedimentary material of silts and clays. In the southern San Joaquin Valley and elsewhere, water wells are screened in the higher resistivity beds of sand and gravel beds, which have characteristics conducive to successful water supply development. Observations of resistivity values for individual beds, or the range of values for a series of beds, were also made.

From observations on the number, thickness, and nature of the geologic beds, and their resistivity values, available well log control was examined for patterns in these parameters to construct and interpret work sections and the representative cross section, X-X' in **Figure 3**. Four areas are distinguishable from this evaluation based on consistent characteristics (i.e., thickness, nature, resistivity values) which define a sedimentary facies (i.e., general nature and characteristics). The facies are a reflection of the depositional environment in which the beds were formed, such as stream channels, alluvial fans/plains or lakes. The four areas of distinctive facies shown on Cross Section X-X' are from east to west: Alluvial Plain; Sandflat; Lake Margin; and Lake Bed. Each facies is described below:

Alluvial Plain Facies

At the east end of Cross Section X-X' (see **Figure 3**), the Alluvial Plain facies consists of numerous, thick sand beds with relatively high short normal resistivity. Resistivity values for these beds range from low 20s up to 50 ohms and are interbedded with some thin, low resistivity fine grained beds. A typical log for this facies is from Well 25H on Cross Section X-X' (see **Figure 3** and attached **Logs**). The interpreted depositional environment is a distal alluvial plain where streams and flood flows spread out, laying down lobes of sand as the gradient decreased towards the base level of the lake to the west.

About three miles further east outside the study area, available well control indicates that the Alluvial Plain facies exhibits even higher resistivity and is interbedded with lower resistivity beds. These characteristics possibly reflect a more fluvial or stream dominated alluvial plain with floodplain or soil horizons.

Sandflat Facies

To the west of the Alluvial Plain facies, the Sandflat facies is characterized by numerous, thin to thick, medium short normal resistivity sand beds which inter-bed and inter-finger with low resistivity lake clays, (see **Figure 3**). The short normal resistivity values of the sand beds range from the low 20s to the east decreasing westward to less than 15 ohms. The sands are divisible into four sand sequences separated by clay beds associated with high lake stands. A typical log for this facies is from Well 27N on Cross Section X-X' (see **Figure 3** and attached **Logs**).

The interpreted depositional environment of the Sandflat facies is where thin beds of sand were deposited as flow velocities decreased near lake base level and the ability to transport sand diminished. Possibly small alluvial, delta-like lobes may have developed and built out into the lake in this area. The sand beds can be seen to decrease westward with thickening interbeds of lake clays (see **Figure 3**). The western edge of the Sandflat facies is believed to mark the western extent of 'V' Sands that are of sufficient thickness and resistivity to be

potential targets for low to modest yields of groundwater to wells. The western edge of the Sandflat facies is interpreted as the demarcation point where lake or lacustrine deposition became dominant in standing waters.

Lake Margin Facies

The Lake Margin facies is characterized by thick, low resistivity, fine-grained lake clays. Short normal resistivity values are very low ranging from less than 5 ohms to 8 ohms. Interbedded with the lake clays are a few, thin sandy or silty clay beds with resistivity values of less than 10 ohms to less than 15 ohms. A typical log for this facies is from Well 30N on Cross Section X-X' (see **Figure 3** and attached **Logs**). Notably, these low resistivity beds can be stratigraphically correlated eastward to the sandy sequences of the Sandflat facies consistent with the interpreted depositional processes described above.

The depositional environment of the Lake Margin facies is standing water of the lake where fine-grained sediments of silt and clay settled. The few thin, slightly higher resistivity beds are believed to be sandy or silty clays formed by high sediment influx of flood flows or possibly density currents.

The thin-bedded nature, fine-grained character, and low resistivity of the stratigraphic marker beds in the lake margin facies are not water supply targets and no water supply wells are known to be completed above the E-Clay in this area.

Lake Bed Facies

At the west end of Cross Section X-X' (see **Figure 3**), the Lake Bed facies is characterized by thick, very low resistivity beds of clay and silty clays. Short normal resistivity values of these beds are generally less than 5 ohms. Thin, stratigraphic markers occur with slightly higher resistivity, but are generally less than 2 to 4 ohms greater than the adjacent clay beds and may be difficult to discern on logs using scales typical of water well surveys (e.g., 0 to 50 ohms or 0 to 100 ohms). A typical log for this facies is from Well 27A shown on Cross Section X-X' (see **Figure 3** and attached **Logs**).

The depositional environment for the Lake Bed facies is the deeper lake waters where fine-grained, silt and clay sized sediments settled. The thin, slightly higher resistivity beds represent periods of high sediment inflow and/or turbid density flows into the lake. West of the Cross Section X-X' for 4 miles, geophysical surveys from four recent boreholes included a natural gamma ray log (see X''-X on **Figure 3**). Five distinct gamma ray spikes, or cluster of spikes, were found to correlate between these boreholes. Two of these occurred above and below the E-Clay. The uppermost three gamma ray features appear to correlate to the thin resistivity zones on the westernmost borehole on Cross Section X-X' and may represent volcanic ash that fell into the lake, or was carried into the lake by streams. The spikes may provide a means to correlate the thick lake clay beds where other stratigraphic markers are not discernable; however, most geophysical logs do not include the curve.

The thin, very low resistivity stratigraphic markers in the lake bed facies are not water supply targets and no water supply wells are known to be completed above the E-Clay in this area.

4.4 Extent of 'V' Sequence Facies

From the detailed examination and stratigraphic correlations, including those presented on representative Cross Section X-X', and development of a depositional facies model, the areal extent of the 'V' Sequence facies were mapped in the northern and eastern portions of the Tulare Lake Bed. These areas are the North and East subareas in the KDSA (2014) study. The resistivity values and bedding characteristics (thickness, number, and nature) on the cross-section wells were used to determine facies trends and then evaluated more broadly with geophysical logs from other wells, including other water wells and oil and gas test holes.

The depositional facies of the 'V' Sequence in the Tulare Lake Bed area are shown on **Figure 4**. The delineated facies form an arcuate (curved or bowed) pattern around the north to northeast lake bed region. Available geophysical log control in the west and south areas is more limited because of a lack of wells. The Sandflat facies boundary indicates the interpreted extent of sand beds in the 'V' Sequence with the potential to be used as MUN and AGR supply sources. In the northernmost area it appears that only a lower 'V' sequence sandflat beds occur below a depth of 250 feet overlain by lake-margin to lake-bed facies clay beds. Upper 'V' Sequence sandflat beds appear to occur only to the east as indicated on **Figure 4**.

4.5 Above 'V' Sequence

As shown on Cross Section X-X' on **Figure 3**, overlying the 'V' Sequence is the interpreted A-Clay unit of Croft and Gordon (1968) and Croft (1972). This unit is the vertical delisting boundary discussed in KDSA (2014). At the surface, the Tulare Clay basin soil unit is encountered throughout the Lake Bed area, also as discussed by KDSA (2014).

4.6 Other Lake Bed Areas

The 'V' Sequence sands at the margins of the KDSA (2014) North and East subareas (see **Figure 1b**) have characteristics related to the interpreted depositional setting. Based on the facies type, horizontal limits of sand beds that represent feasible water supply targets can be delineated. The well control in these areas is greatest because they occur where coarse-grained sediments reached the lake bed margins and are of sufficient thickness and character to serve MUN and AGR beneficial uses.

Other areas, corresponding to the KDSA (2014) South and West subareas (see **Figure 1b**), have notably sparser well control, but also no developed water supply sources above the E-Clay. Available well control suggests that these areas are predominantly thick clay with low resistivity beds and markers of slightly higher resistivity similar to the Lake Bed facies. For example, short normal resistivity values for logs from Well 30R and 15K in the South Subarea, scaled at 0 to 20 and 0 to 10 ohms, respectively, range from 2 to 3 ohms up to 7 ohms. In the West Subarea, in the vicinity of Kettleman City, geophysical evidence suggests the possibility of sandflat to lake margin facies sourced from the Coast Range. Though control is very limited, a tentative delineation of 'V' Sequence sands, or equivalent, is made in the KDSA (2014) West Subarea, but these are poorly developed and a realistic boundary would be inside the 'V' Sands West demarcation shown on **Figure 4**. East of the KDSA (2014) South Subarea, well control outside the delisting study area shows evidence of possible alluvial plain to sandflat facies sourced from the east, south, and/or southeast.



5. Findings Related to Horizontal and Vertical Delisting Boundaries

Horizontal and vertical boundaries are discussed below in relation to the stratigraphic model described in this technical memorandum.

5.1 Horizontal Boundaries

The stratigraphic model presented in the current evaluation delineates two distinct settings with respect to delisting of the Tulare Lake Bed area: 1) a fringe area in the north and northeast corresponding to the KDSA (2014) North and East subareas where sand beds below the A-Clay represent potential sources of MUN and AGR beneficial uses and 2) the rest of the lake bed area dominated by thick, low resistivity clay beds with no MUN or AGR beneficial uses. The sand beds in the north and northeast fringe area indicate a progression of facies transitioning from thick, numerous sand beds outside the Lake Bed to thick clay with low resistivity beds in the center.

Two horizontal boundaries are presented on **Figure 5** that delineate the areas cited above and reflect the combined findings from KDSA (2014) and the current evaluation. First, the KDSA (2014) recommended horizontal boundary encompasses the majority of the Tulare Lake Bed area and considers known MUN beneficial uses near the City of Corcoran and the communities of Stratford, Alpaugh, and Kettleman City. The stratigraphic model in the current evaluation provides a secondary boundary that extends further into the Lake Bed from the north and east to account for the occurrence of sand beds representing potential water supply sources subject to the SDWP; these sand beds are also identified in KDSA (2014).

No changes to the outer recommended horizontal boundaries in the KDSA (2014) report are proposed in the current evaluation. A secondary boundary interior to the lake bed in the north and east is presented on **Figure 5**. This boundary separates two different vertical delisting areas based on the stratigraphic model as discussed in the next section. The two areas are distinguished on **Figure 5** with the hatched area representing the extent of 'V' Sands that inter-finger into the Lake Bed fringes.

5.2 Vertical Boundaries

Figure 5 presents the extent of stratigraphic facies where sands may be encountered that potentially support MUN/AGR uses below the A-Clay vertical delisting boundary recommended in KDSA (2014). In this fringe area, 'V' Sequence sands inter-finger within the lake bed clays and are overlain by the A-Clay.

In the area between the KDSA (2014) horizontal boundary and the secondary, stratigraphic demarcation in this study, it is recommended that the interpreted top of A-Clay be the vertical boundary. This is where first-encountered water above that boundary exceeds MUN and AGR beneficial use criteria as determined in KDSA (2014). As part of the current investigation, groundwater electrical conductivity was estimated for 'V' Sands using the Spontaneous Potential (SP) curve from the recent well logs. Calculations from the SP deflections indicated that these interbedded sands below the interpreted A-Clay in the fringe area have specific conductance values from just under 3,000 µS/cm to greater than 5,000 µS/cm. While these values may explain

the lack of water supply wells completed between the A-Clay and E-Clay in this area, some groundwater in these units may not satisfy criteria for MUN delisting (i.e., $5,000 \,\mu\text{S/cm}$).

In areas outside the north and northeast fringe where thick lacustrine clay units of the Lake Bed facies are predominant and no known wells support MUN or AGR beneficial uses, the vertical boundary is recommended at the top of the E-Clay. **Figure 6** shows contours of equal depth below ground surface to the top of the E-Clay. Well control and the E-Clay depths are shown on the attached **Plate**. Other than the northern and eastern fringe areas where numerous water well logs were available, much of the contour map for the E-Clay boundary was constructed using oil and gas well logs obtained from the California Division of Oil, Gas and Geothermal Resources website. Both resistivity and gamma ray (when available) curves were used to determine the E-Clay depth.

Figure 7 presents vertical delisting boundaries throughout the lake bed with top of A-Clay as the vertical boundary in the north and east area (see hatching) and top of E-Clay throughout the rest of the lake bed.

Attachments

Figures 1-7

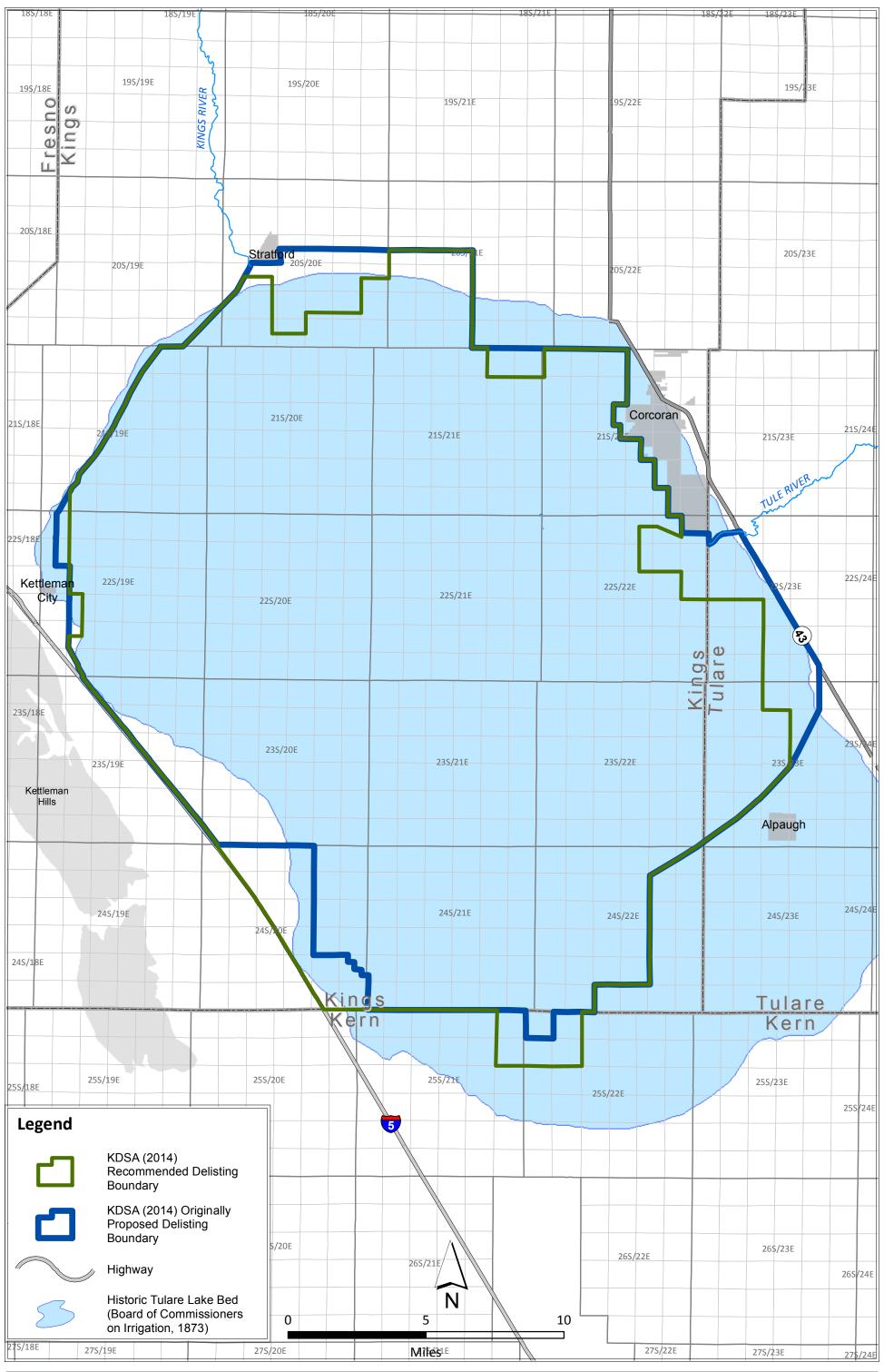
Plate: Well Control and Contours of Equal Depth to Top of E-Clay

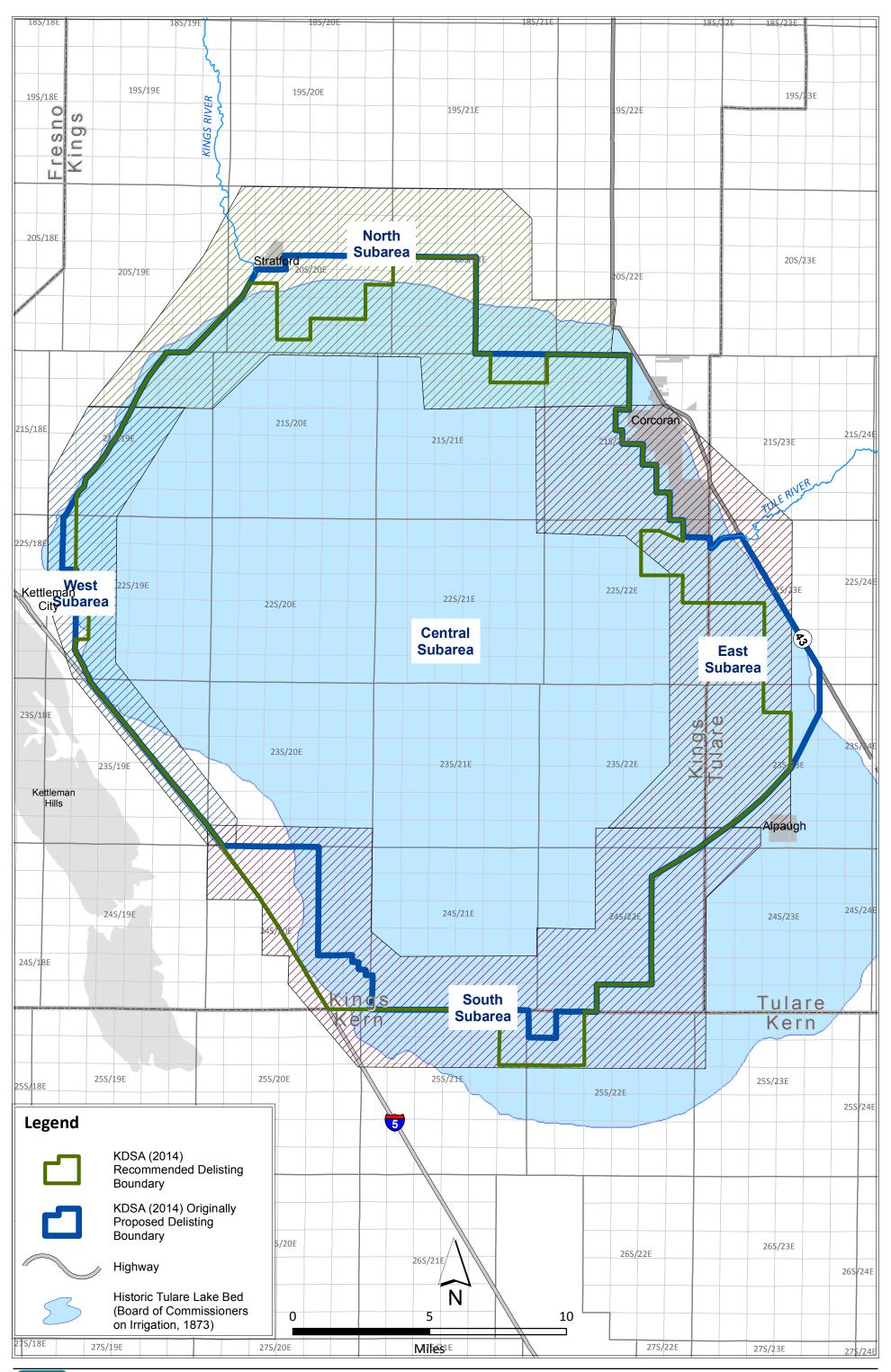
Logs: Recent Wells with Geophysical Logs; Oil and Gas Wells (CD)

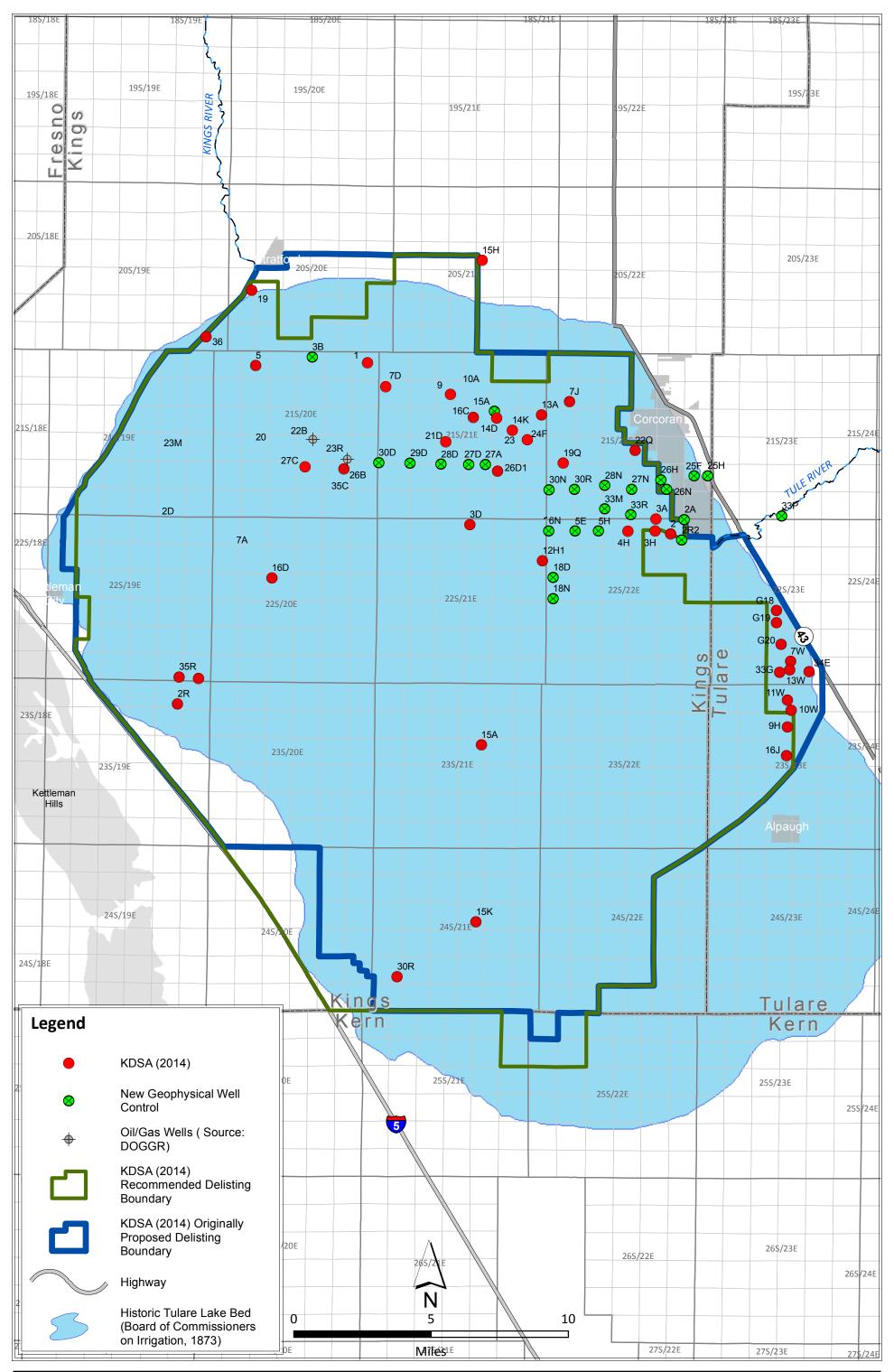
References

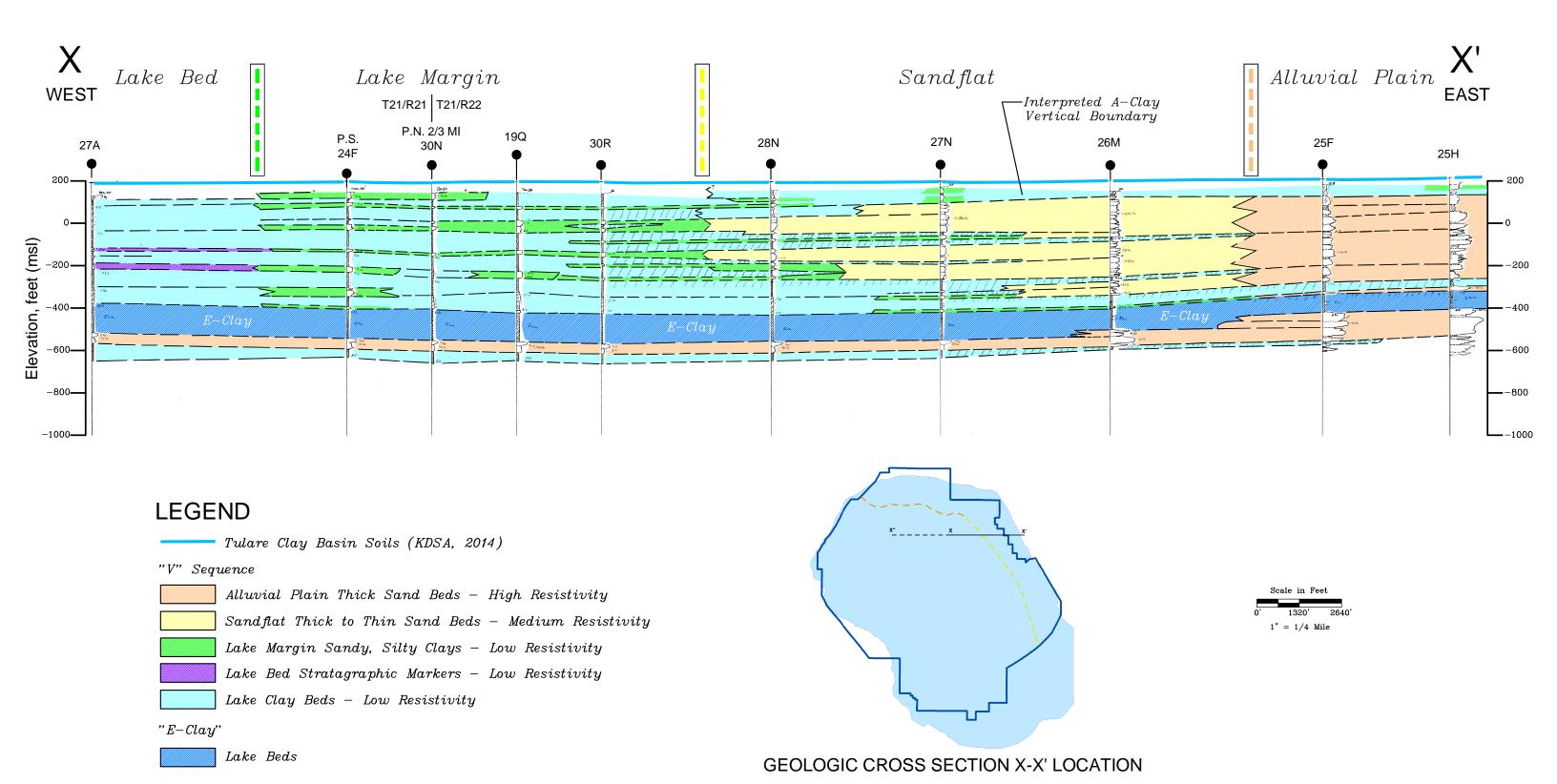
- _____. 1873. Map of San Joaquin, Sacramento and Tulare Valleys, State of California. Prepared under direction of the Board of Commissioners on Irrigation, appointed under the Act of Congress approved March 3rd 1873, showing the country that may be irrigated and a provisional system of irrigation. Compiled from the Maps of the Geological Survey of California and from Special Survey and Examinations.
- California Department of Water Resources. 2003. California's Groundwater, Bulletin 118 Update 2003.
- Croft, M.G. 1972. Subsurface Geology of the Late Tertiary and Quaternary Water Bearing Deposits of the Southern Part of the San Joaquin Valley, California. USGS Water Supply Paper: 1999-H.
- Croft, M.G. and Gordon, G.V. 1968. *Geology, Hydrology, and Quality of Water in the Hanford-Visalia Area, San Joaquin Valley, California*. USGS Open-File Report: 68-67.
- Davis, G.H. and Poland J.F. 1957. *Ground-Water Conditions in the Mendota-Huron Area, Fresno and King Counties, California*. USGS Water Supply Paper: 1360-G.
- California Division of Oil, Gas and Geothermal Resources. Accessed various dates October 2014. http://maps.conservation.ca.gov/doggr/index.html.
- Kenneth D. Schmidt and Associates. 2014. *Technical and Regulatory Evaluation of MUN and AGR Beneficial Uses in the Tulare Lake Bed Area*. February 12.
- Page, R.W. 1986. Geology of the Fresh Ground-Water Basin of the Central Valley, California, with Texture Maps and Sections. USGS Professional Paper: 1401-C.
- Wood, P.R. and Davis, G.H. 1959. *Ground-Water Conditions in the Avenal-McKittrick Area, Kings and Kern Counties, California*. USGS Water Supply Paper: 1457.

Figures









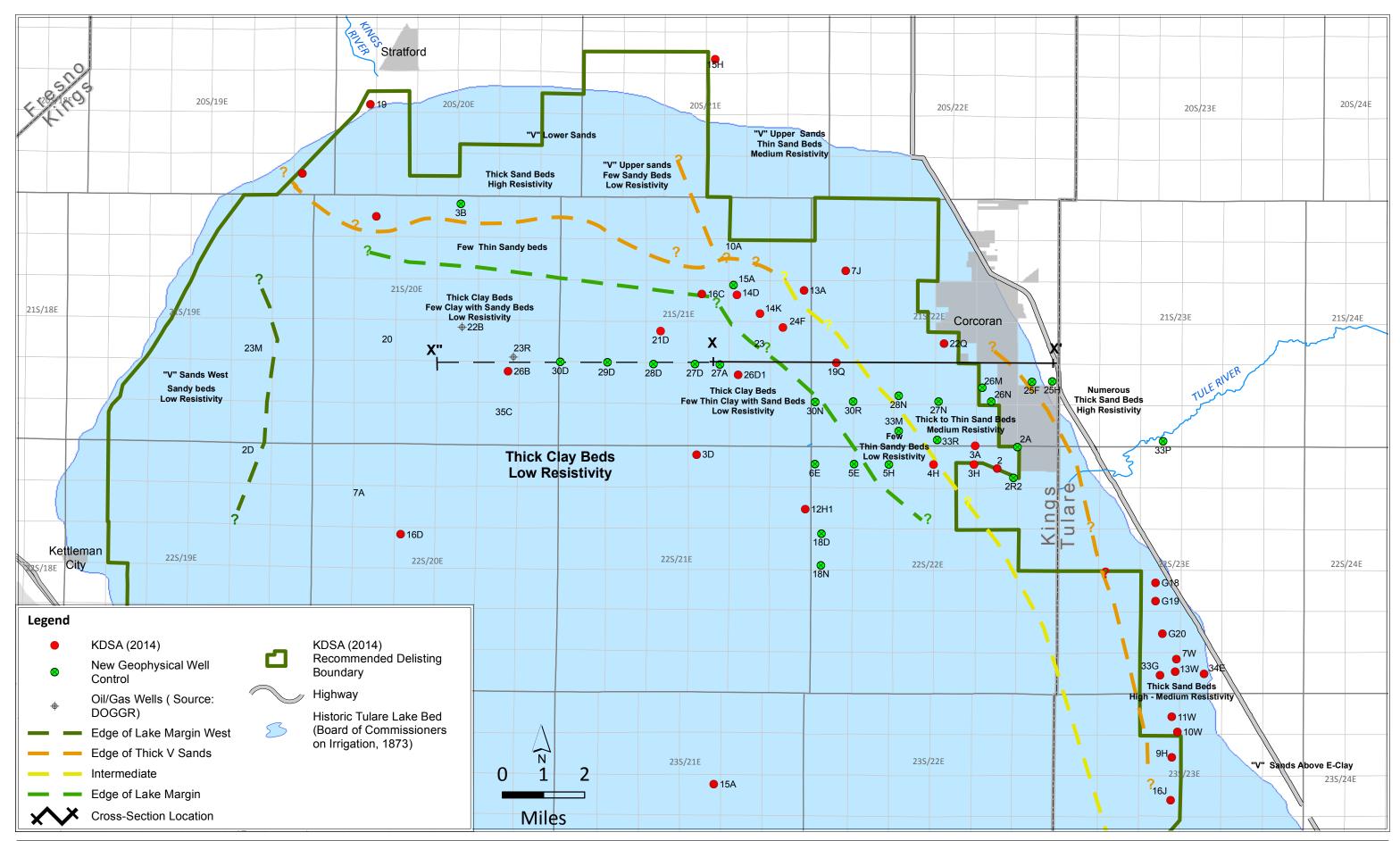
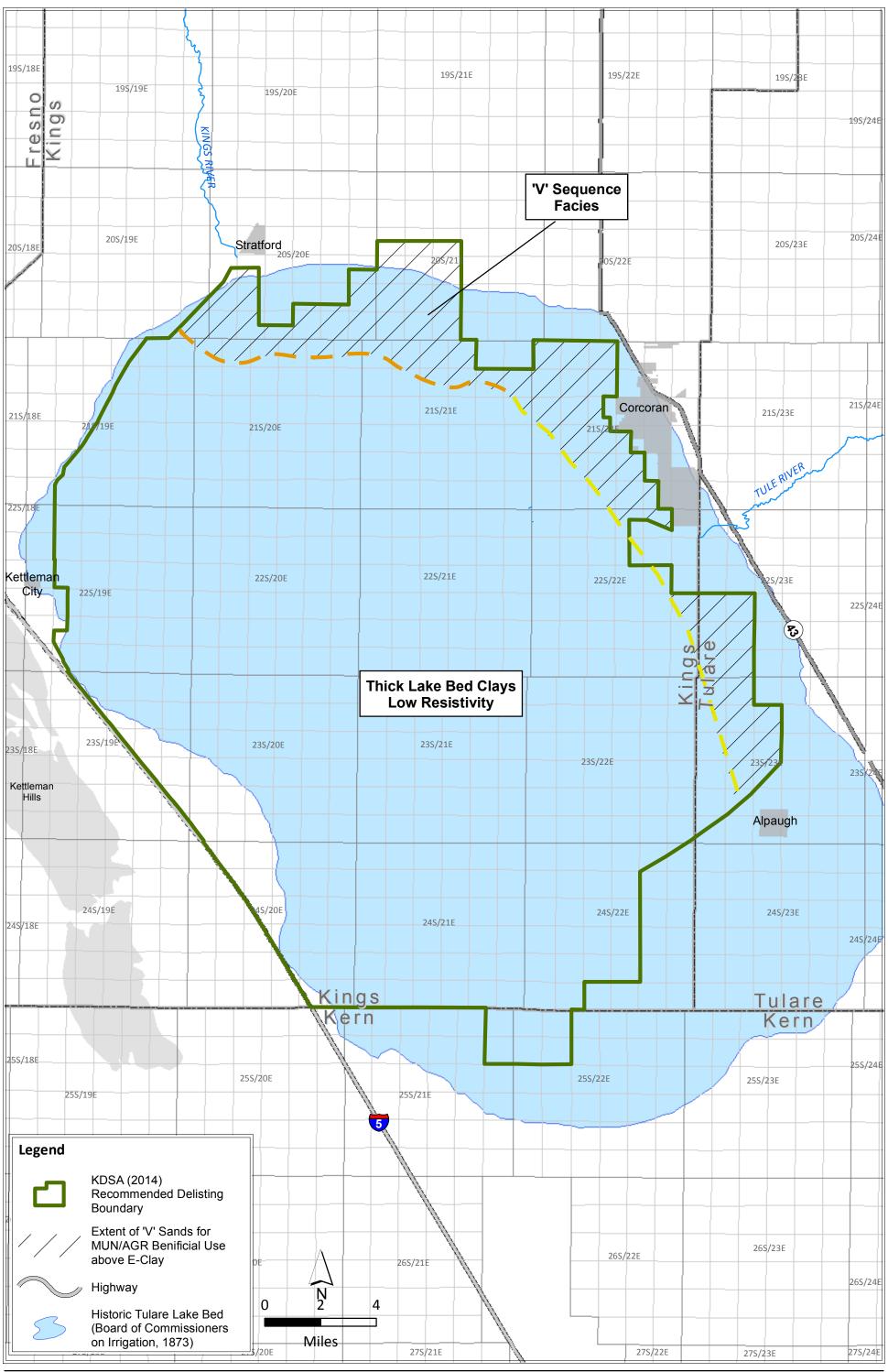
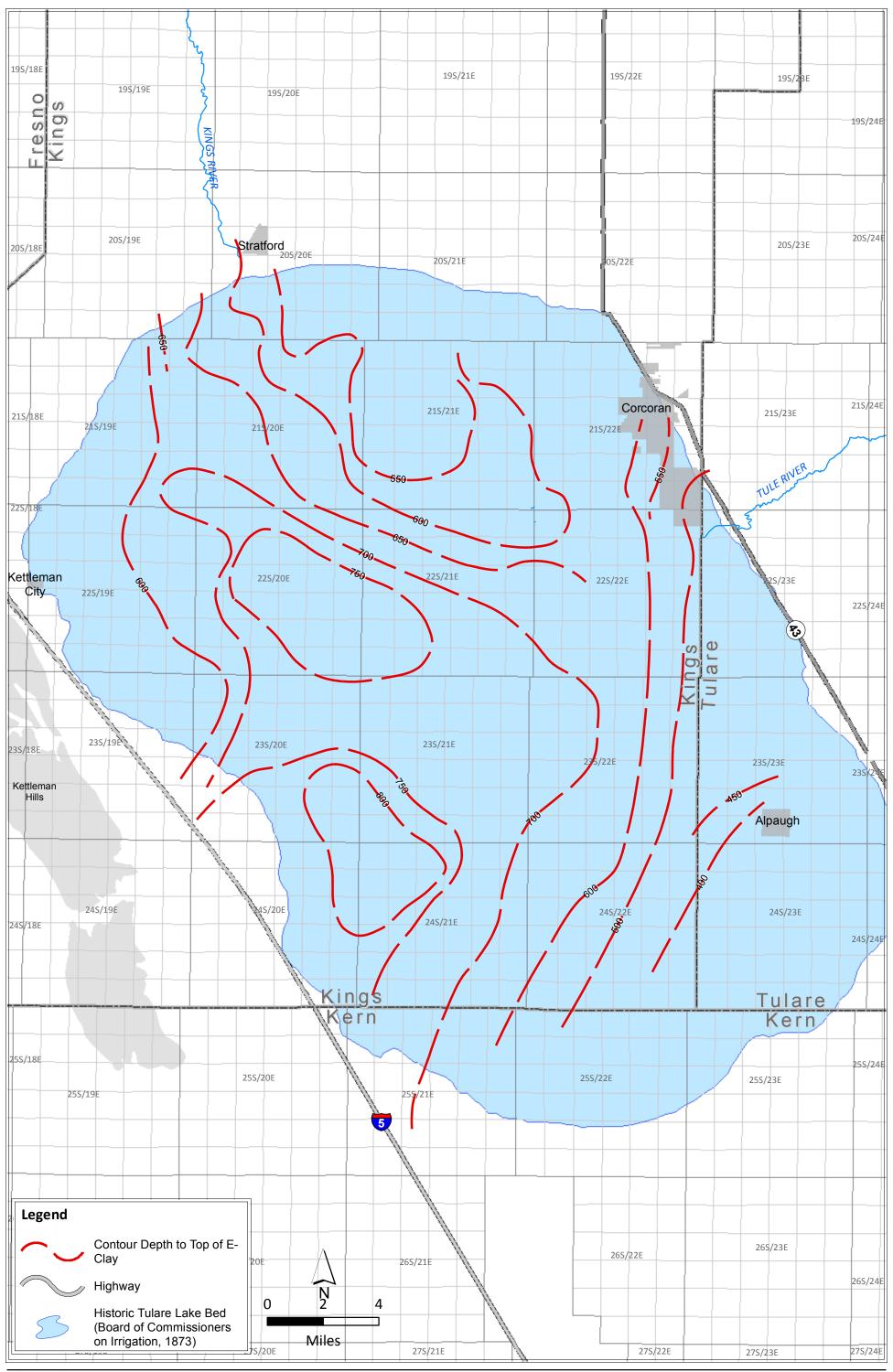




Figure 4
Extent of 'V' Sequence Facies
Tulare Lake Bed





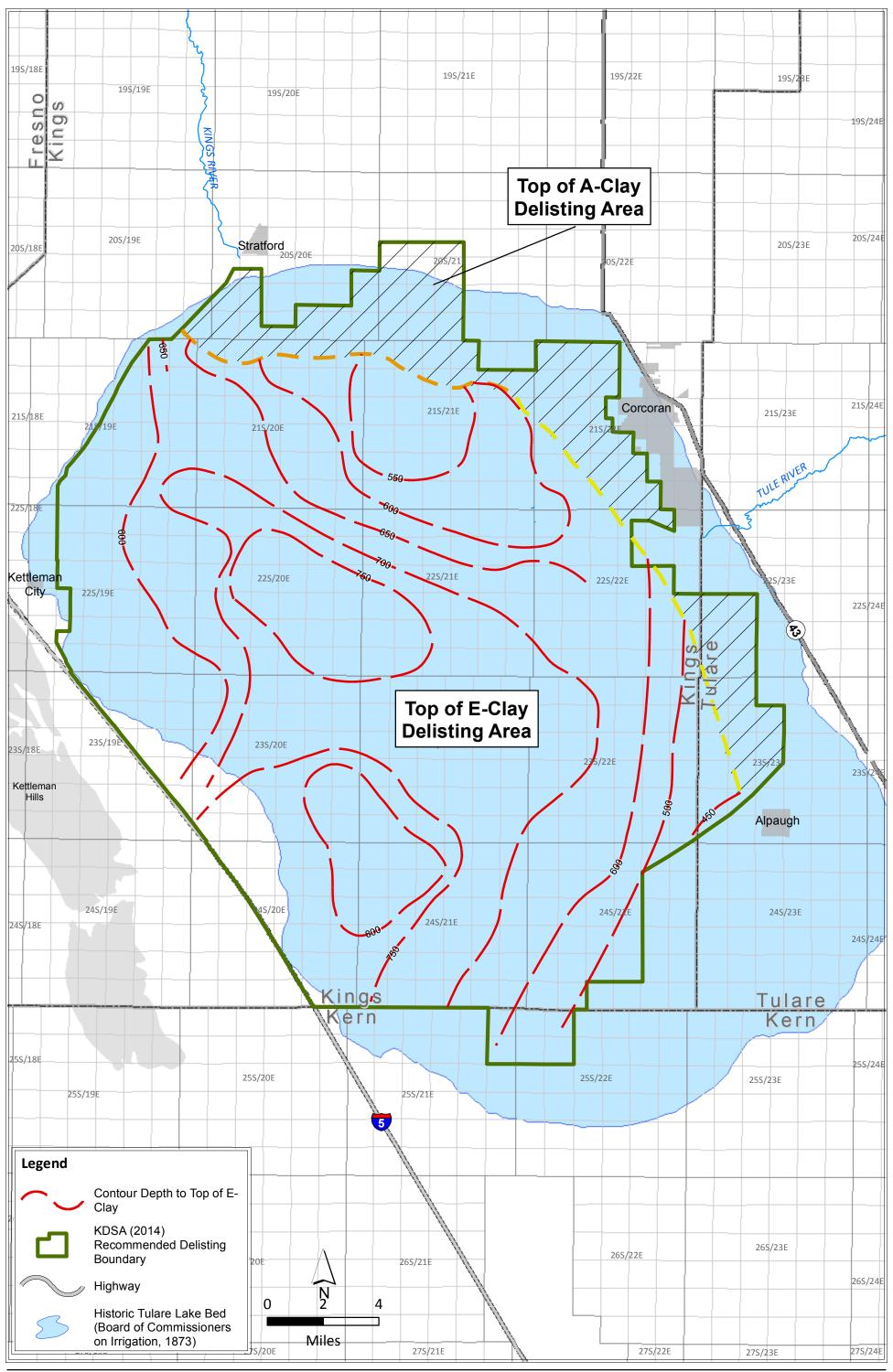
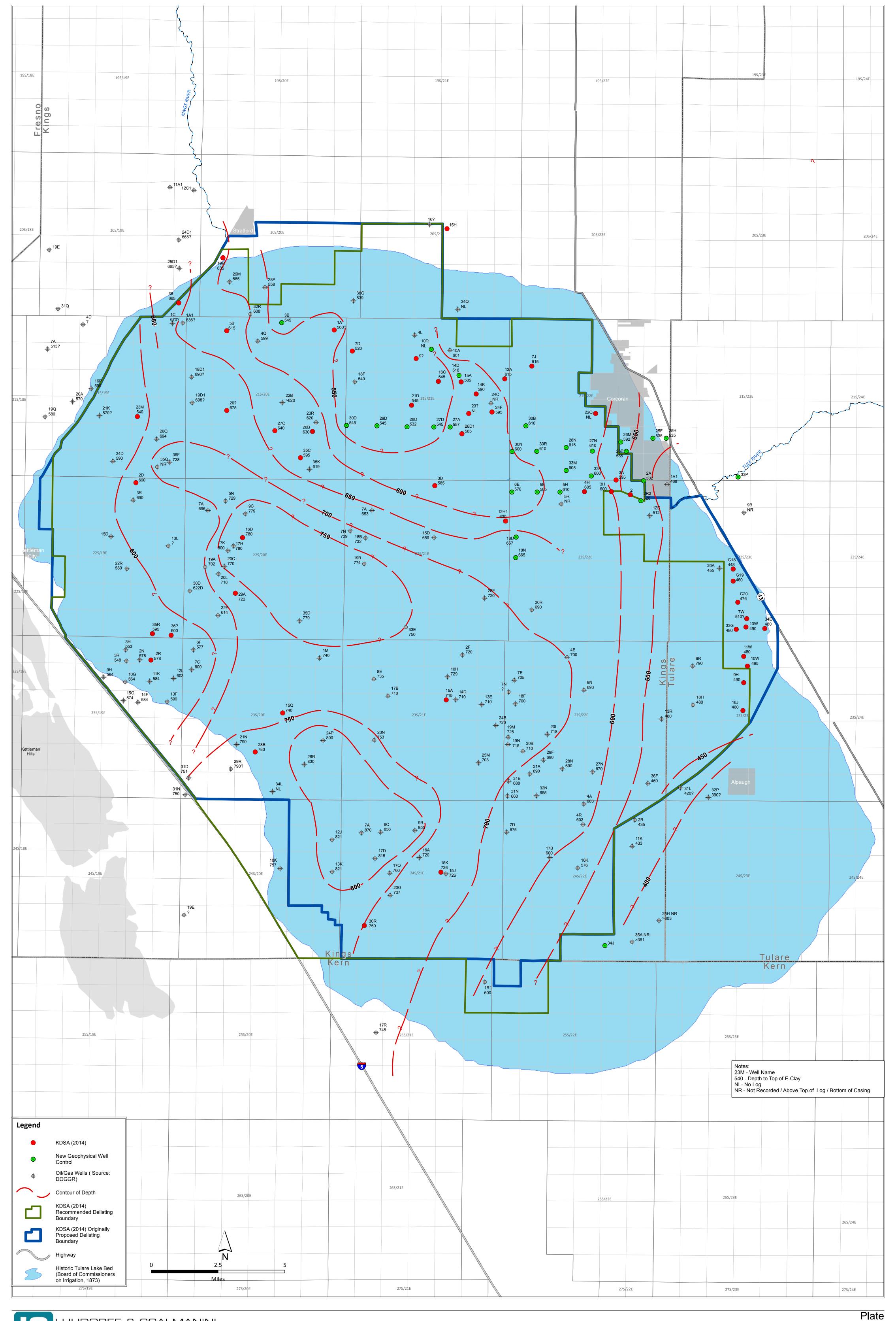


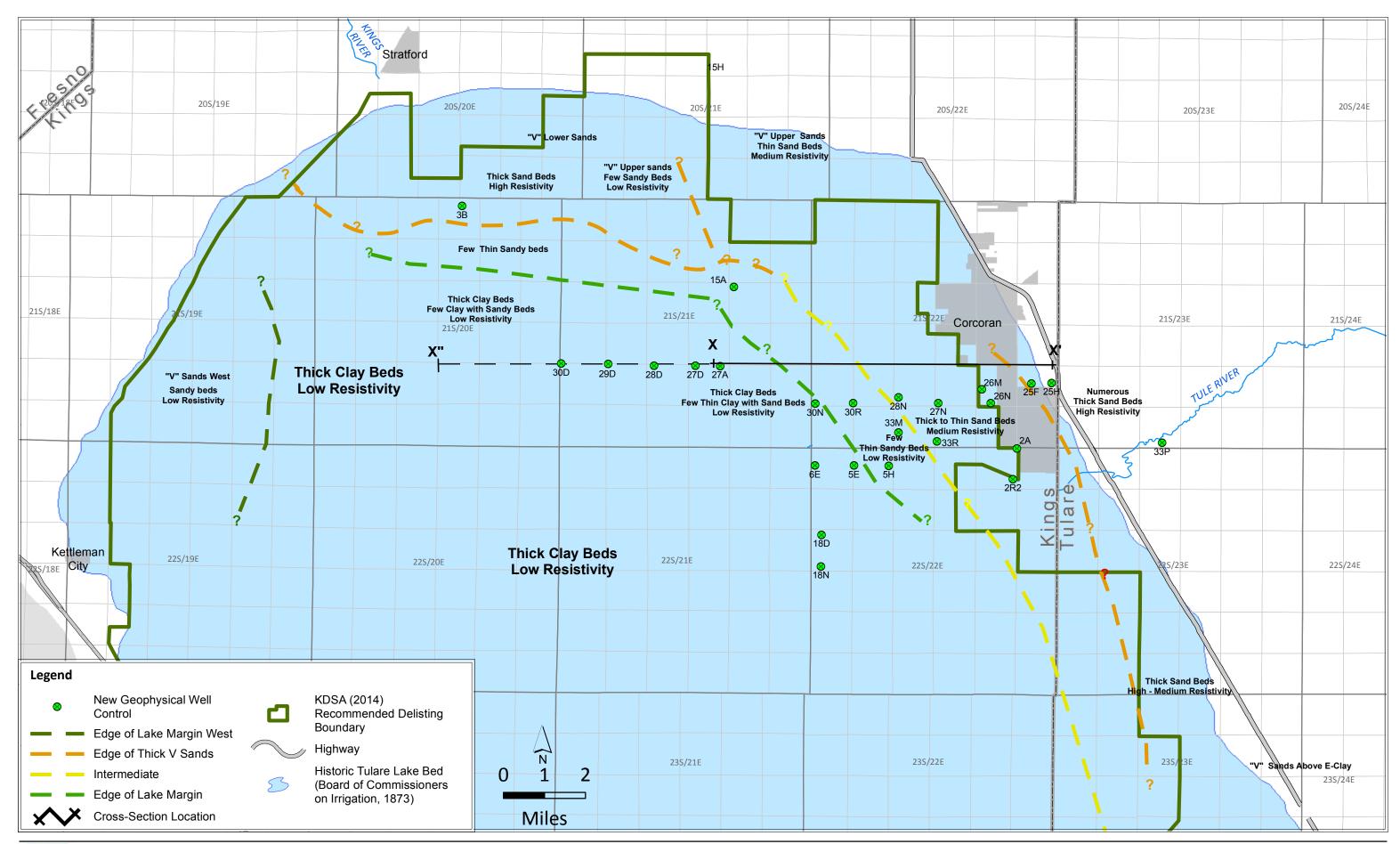
Plate (1) (2) Well Control for E-Clay Contour Map

- (1) Logs from KDSA (2014) not included.
- (2) Oil and gas logs contained on CD.

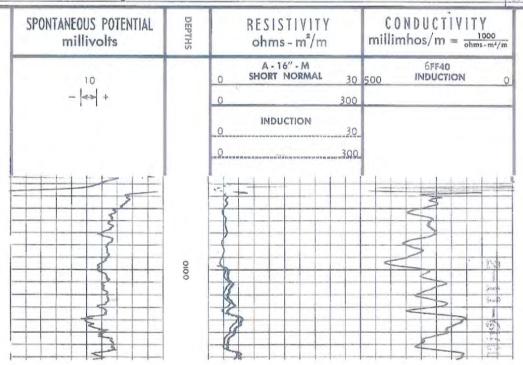


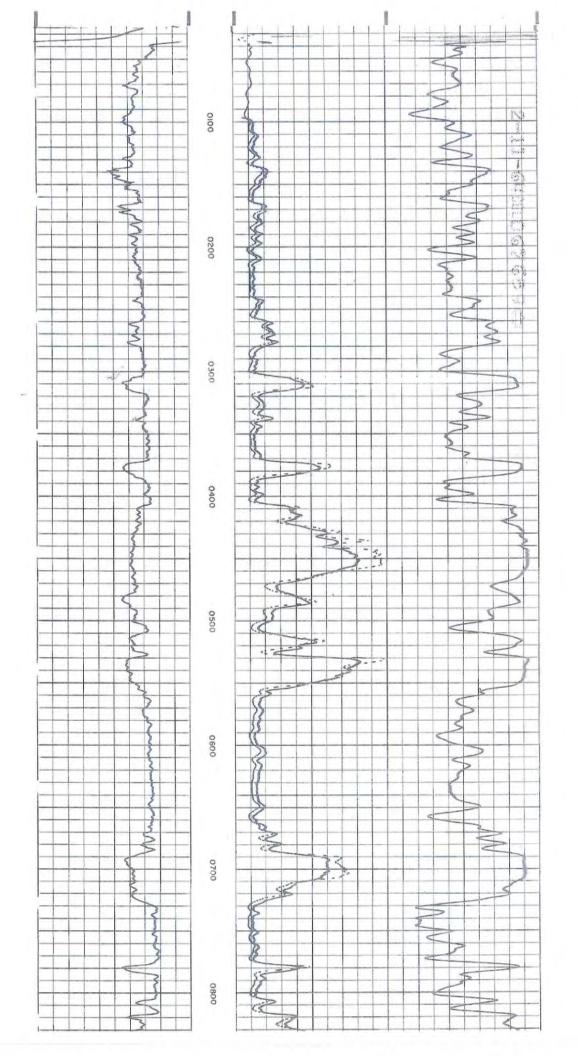
Logs (1)
Recent E-Logs
Additional Oil and Gas Logs (2)

- (1) Logs from KDSA (2014) not included.
- (2) Oil and gas logs contained on CD.



Vitnessed By	quip. Location	Max. Rec. Temp.	R _m @ BHT	Source: Rmt Rmc			R. @ Meas. Temp.		D	Dens. Visc.	ype Huid in Hole	Sil Size	Casing—Logger	Casing—Driller	op Log Interval		Depth-Logger	epth—Driller	on No.	Date	Summy Measured	ermanent Datum:	FIN	OU JELD	ATIO	NC NY.	3-5	AR	-?		E	77			1	SCHLUM		V
WALDREN	3716 CL	99 °F	1.86 99.4	-	900	9	7 3	PIT	8 5 8ml		FRESH	15"		1 @	37	1 / 1	1	-	1 0	2-7-65	1	m KB	opt	دد		LOCATION	COUNTY	FIELD I		WELL		COMPANY			Sc	CHLUMBERGER	1	
EN N	3716 CL	99 °F	8.4	1	1	0	200	CIRCIII	8		FRESH	REMARKS	,	- @ -			1	1	2	2-7-65		10 Ft. Above Perm.	П	215			KINGS	ULARE LAKE				3.		non		INDUCTION -		
			(1)		® (a	a	-						@								185 n. Datum	100	20F			STATE						١	nousion, lexas	L SURVEY	ELECT		
\parallel		a P	9	-	n-	0	n		3	-	1					+	+	-	-	-	0	Elev.: K.		Sign		Other	CALIF						I	9	ING CO	RIG		
			(1)	-	3	a	(B)	-		4				@		1					1	D.F. 195				Other Services:	CALIFORNIA						١		RPORATIO	AL 10		
FOLD	н	n RE	-n	1	on-	ñ.	o Ti		3	1	_					_	_	1	1	_		+1	L				_	2.0				_	1		ž	90		
REM	_										_	-		_	_			_	_	_			_															
Char Date Dept Type	h-	Sam —Di	ple	No	0.	ре	01	r A	Nd	diti	one	i S	Sor	npi	es					Ту	уре	e Log		De	pth		Scale			ges Hol	0	Sc	ále	Do	wn I	Hole		1
So	urc	Flu	Visc id L Sar as. 7	oss	e	_		(a)	0		ml °F		_		a)		0	6	D.	in I	Ne	T.		Тур		E	quipi							04			9	n h
R _{mi} R _{mc} Sou	G	Me	as. T	em	p. p.		_	(0)	9		oF oF			(0		0	F	KU	1 2		, , ,	6F 6F	F40)		ST	AN	D	OFF OFF				01	her		- Unit	3
Rmi	6	BH	٢	R	J _n	Z	0 .	@	5	3	°F		_	(B	°F	F	3.1.3	7 F	_	RUN	#	2													6	
Equi	p.	Use	d: C		T.	S.C N	D.: D.: O.:	-	1 ½	ED		_						_		See, bo.	_		-17.															T T
				NI	DE	N			F.M.	36	1					_													_								1	1.
	Tion of the last o	SPO	TMC				S			EN	TI	VL.			DEPIN	7707						ES1S						1	mi	C O					IT,	V 000		_





215/22€

SEMODIAC										
REMARKS						_				
Changes in Mud Type or	Odditional	Samo	les				S	cale Char	ges	
Date Sample No.	Had I C. One !	T	1	-	Tupe L	.09	Depth	Scale L		Scale Down Hole
Depth-Driller		1			-					
Type Fluid in Hole										
900 . 1010 111 / 010								L. Territoria		
Dens. Visc.										
ph Fluid Loss		ml		mi						
Source of Sample							E	quipment	Data	
Rm at Meas. Temp.	at	F	at		Run No.			PadType	Tool Pos	Other
Rmf at Meas. Temp.	at	F	at	F	ONE	EL	ECTRIC		FREE	
Rmc at Meas, Temp.	at	F	at	F						
Source: Rmf Rmc										
Rm at BHT	at	F	at	F						
Rmf at BHT	at	F	at	F						
Rmc at BHT	at	F	at	F						

RESISTIVITY

Ohmmeters2 /meter SHORT NORMAL

16 Inch

LONG NORMAL

64 Inch

Run No.

ONE

TWO

THREE

Driller

Date

Drilling Measured

Casing-Logger Casing-Driller Btm. Log Inter. Depth - Logger Depth -

30.

at N/A at 40.

DEPTH

00100

SP CURVE 0

3

17-1/2"

30"

Top Log Inter.

Bit Size

Type Fluid In Hole

Visc.

N/A N/A

N/A N/A mI

PH Dens.

Max. Rec.

Temp.

N/A

Z. BOBINSKI L-10 BFLD

B. GROGAN

3 HRS N/A MEAS N/A at

Source: Rmf Rmc

Rm at BHT

Rmf at Meas. Temp

Rmc at Heas. Temp

30 B

at Meas. Temp

13.8 at 75 F

MUD PIT

14.7 at 75 F

SPONTANEOUS POTENTIAL

millivolts

10mV

Source of Sample Fluid Loss

Witnessed Bu Recorded By Equip Location Time Since Circ. Log Measured From G.L. Ø Ft Above Perm Datum

From G.L

10-25-1992

Permanent Datum: GROUND LEVEL

SEC

25

TUP 218

RGE 22E

Elev:

D.F. K . B . FILING NO

4.4.

ELECTRIC LOG

RESISTANCE

Ohms

SINGLE POINT

Detail Curve

SINGLE

POINT

HELL COMPANY

LOCATION: PLYMOUTH & 4-TH STREET

CALIFORNIA

COUNTY

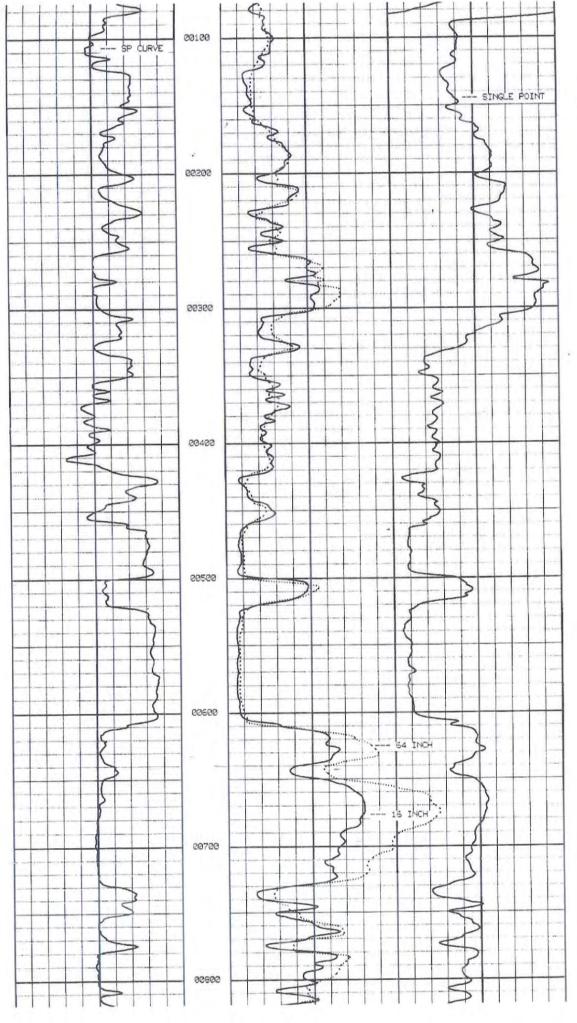
OTHER SERV

100

100

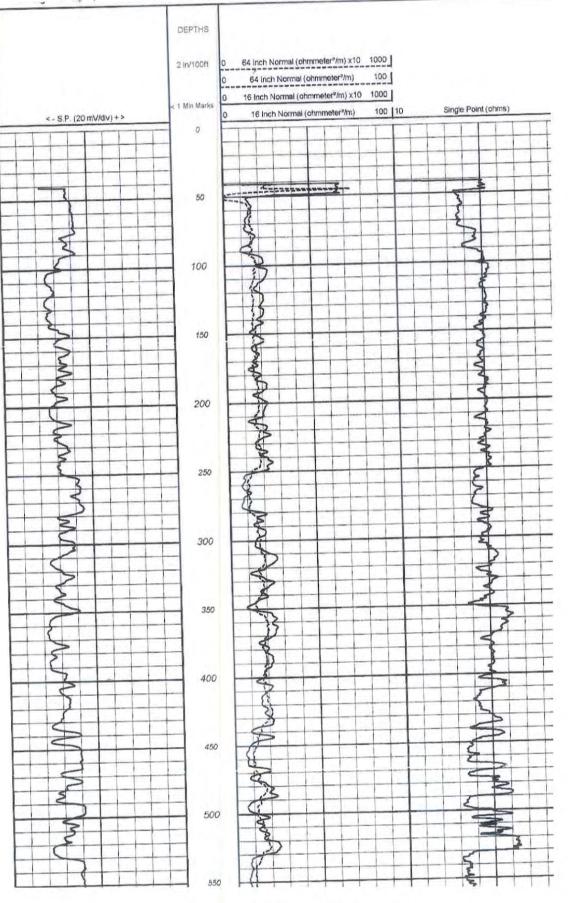
NONE

STATE FIELD

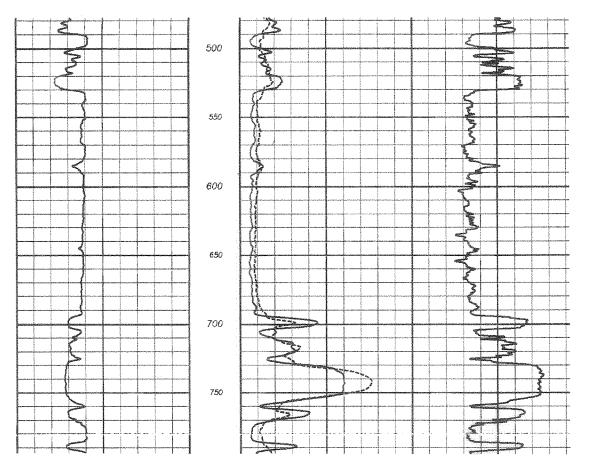


215/22E 26M

-				$\equiv W$	e	end	CO		
5201	Woodmer	e Drive, B	akersfield, C		ww.wel	enco.com-(80			
-	-	3933		TRIC L					
FILING NO.	COMF WELL FIELD	(<u>co</u>	rcoran)_	Tulare			
JOB NO. 7910	-	on: 6th Ave.	RGE: 22E LAT.		LONG.:	111319 1119° 34' 18.5" ME	None		
Permanent D Log Measure Drilling Meas	Datum: ed From:	Ground Ground	Level Level	, E	ev			K.B	_Ft. _Ft. _Ft
Run		One			T		T		
Date Depth-Driller Depth-Logge		Διια 13	Ft Ft		Ft Ft		Ft Ft		Ft
Top Logged Btm Logged	Interval		Ft		Ft Ft		Ft		Ft
Casing-Driller Casing-Logger		30 In 30 In 17.5	@ 50 Ft	In @	Ft Ft	In @	Ft In	in @	Ft In
Bit Size Time On Bo Type Fluid in		9:19 Benton							
Density	Viscosity Fluid Loss		ml		ml		mi		m
Rm @ Measure	ed Temp.	Pit 16.4 @		@	*F	@	°F	@	*5
Rmf @ Measur Rmc @ Measu Source Rmf		16.4 @		<u>@</u>	-F	@	*F	@	*1
Rm @ BHT Time Since		3	0 °F	@	°F Hr	0	°F Hr	@	- H
Max. Rec. 7		L-17	-F		*F		°F		*
Recorded E Witnessed	-	Craig C							



26 M



225/226 2A

	5201 Woodmere Drive, Bakersfield, CA 93313- www.weienco.com-(800) 445-9914 California Contractor's License No. 722373

800) 445-9914 OTHER SERVICES None F. Elev.: K.B G.L G.L G.L H.	Se No. 722373 LOG COUNTY Tulare of 6th Ave and of 6th Ave and Fr	Corcoran California Contractor's License No. 722373 ELECTRIC LOG Corcoran California COUNTY Tu California Corcoran Prison 1. South of Corcoran Prison 3. South of Corcoran Prison 3. South of Corcoran Prison 1. S	A H H H H H H H H H H H H H H H H H H H	FILING NO. FILING NO. COMPY WELL WELL LOCATION STATE LOCATION SOUND STATE LOCATION Road 14 Road 14 SEC. 31 Permanent Datum: Log Measured From: Drilling Measured From: Depth-Driller Depth-Logger Top Logged Interval Bit Size Time On Bottom Density viscosity PH Fluid Loss Source of Sample	FILING NO. FILING NO. FILING NO. BOLOB NO. B904 SEC B904 SEC Permanent Datum: Log Measured From Datie Depth-Driller Depth-Logger Top Logged Interval Bin. Logged Interval Bin. Logged Interval Casing-Driller Casing-Driller Casing-Logger Time On Bottom Type Fluid in Hole Density viscosity PH Fluid Loss Source of Sample
9F @	0	J. @	6.6 @ 75 °F	ared Temp.	Rm @ Measured Temp.
ONE OF THE PARTY O	and the state of t	STEED CONTROL OF THE PROPERTY	and the second s		
és es cons				mple	Source of Sample
		THE PARTY OF THE P	***************************************	NO PORT OF THE PROPERTY OF THE	
Ē		E	8	Fluid Loss	H
	at to a Carlo			Viscosity	Density
	and the second s	The state of the s	Bentonite	In Hole	Type Fluid
			11:54, Mar 2	ottom	Time On E
In a		Ę	SCHOOL STATE OF THE PARTY OF TH	TO CONTRACTOR DESCRIPTION OF THE PARTY OF TH	Bit Size
Ft In @	umpraiottanodettejassamus	EPINAMENA PROGRAM	30	gger	Casing-Lo
Ri In@		On the latest designation of the latest desi	In @ 30	iller	Casing-Dr
7.1		3.1	- Administration of the second	ed interval	Bim. Logg
	A PERSONAL PROPERTY OF THE PRO	FF	Ch.	in any in	
F		Ŧ		ed Interval	Top Logge
Ft		R	FF	lger	Depth-Log
F		Ft	H	ler	Depth-Dri
					Date
			One		Run
G.L.				asured From	Drilling Me
D.F.	e Perm. Datum		Ground Level	ured From:	Log Meas
	ů.	Elev.	Ground Level	t Datum:	Permanen
MERIDIAN: MR. Diablo	3' 195.7"	sustrain in	TWP: 21S		7068 8300
None None	ive and	Intersection of 6th A	rnon: rox . 1/2 Mi. East of the d 144., South of Corco	A A P P P P P P P P P P P P P P P P P P	
Physiological respective for the second section of the	No.	COUNT		STA	
лицьальный албараўскай прациялена свое реме обёресёўскагал		des i comite de la regiona	agapara .	FIE	07M231E5U35
ecus services en executor por constanticul considerate de de en en	ALE THE THE PARTY OF THE PARTY	Vehiczenine	L	WE	
AND SERVICE AND	ORDINATION OF THE PROPERTY OF		#PANY.	3	
					FILING
	9	ECTRIC LO	TI TI		
00) 445-9914	welenco.com-(8 722373	d, CA 93313- www.\ actor's License No.	ere Drive, Bakersfiel California Contra	201 Woodm	<i>%</i>

ದ್ದದ

0 0

0 0

0

22

0 0

5.3

Rmf @ Measured Temp.
Rmc @ Measured Temp.
Source Rmf Rmc

0

0

바보

0

눞

5.0

0

Rm @ BHT

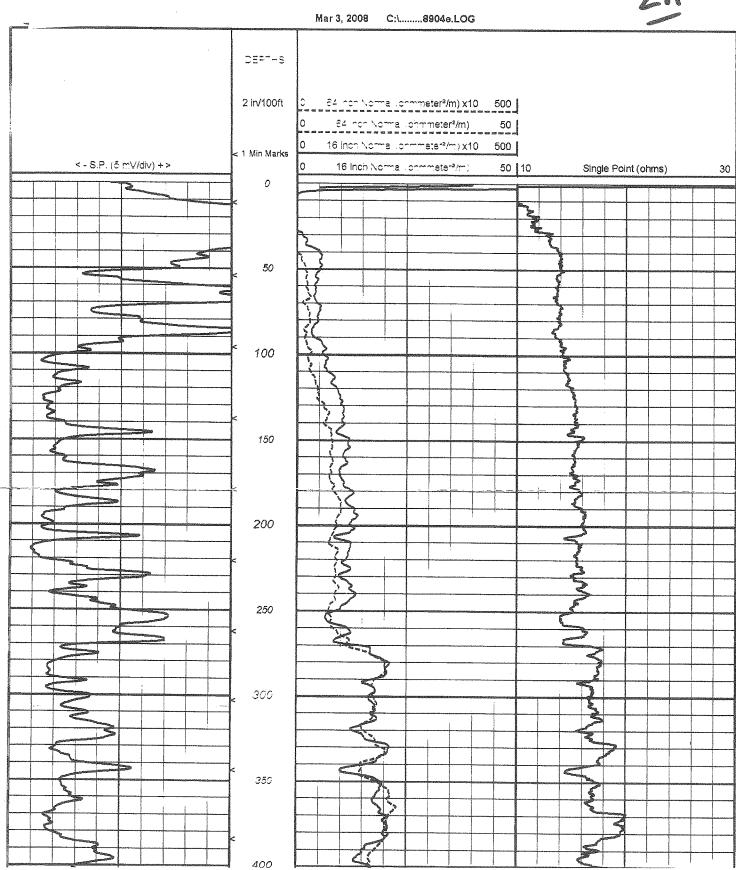
Pifa

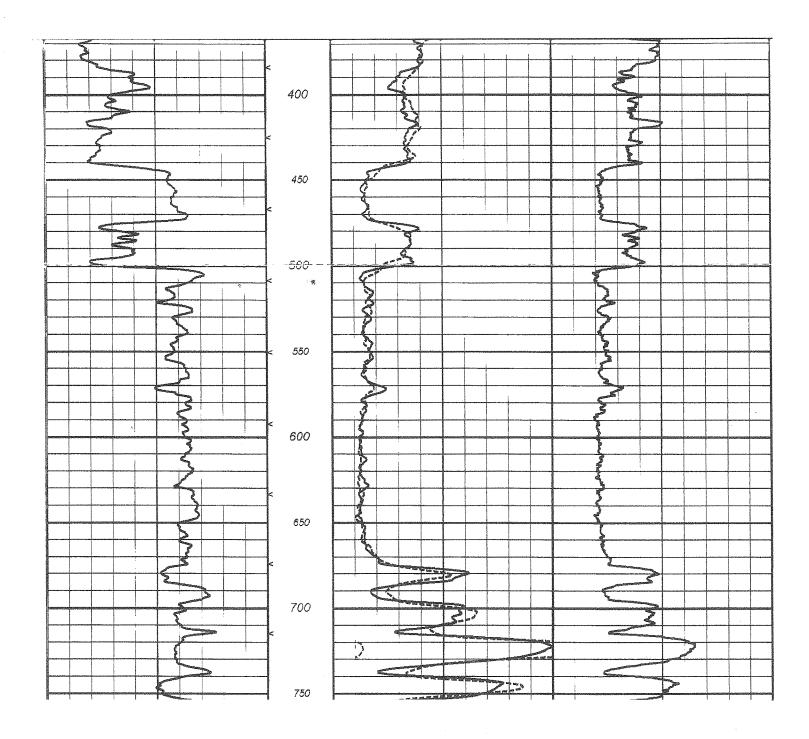
L-23

Time Since Circulation
Max. Rec. Temp.
Van No. Location
Recorded By

Craig Corbell

GEOPHYSICAL WELL LOGS

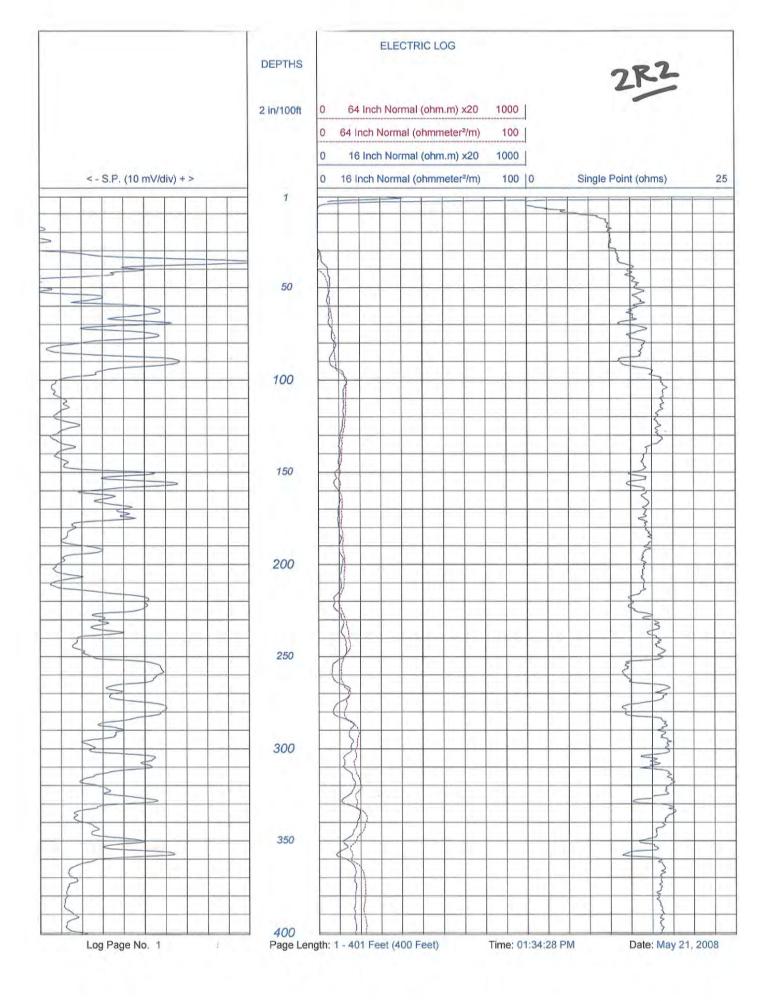


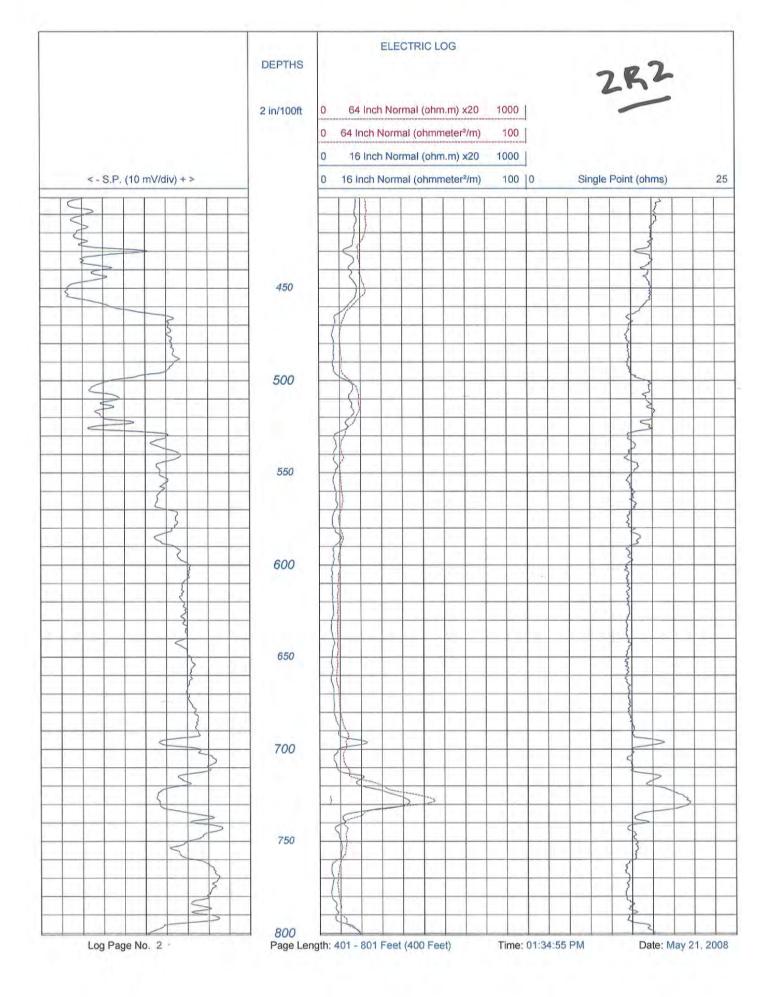


225/22E 2RZ

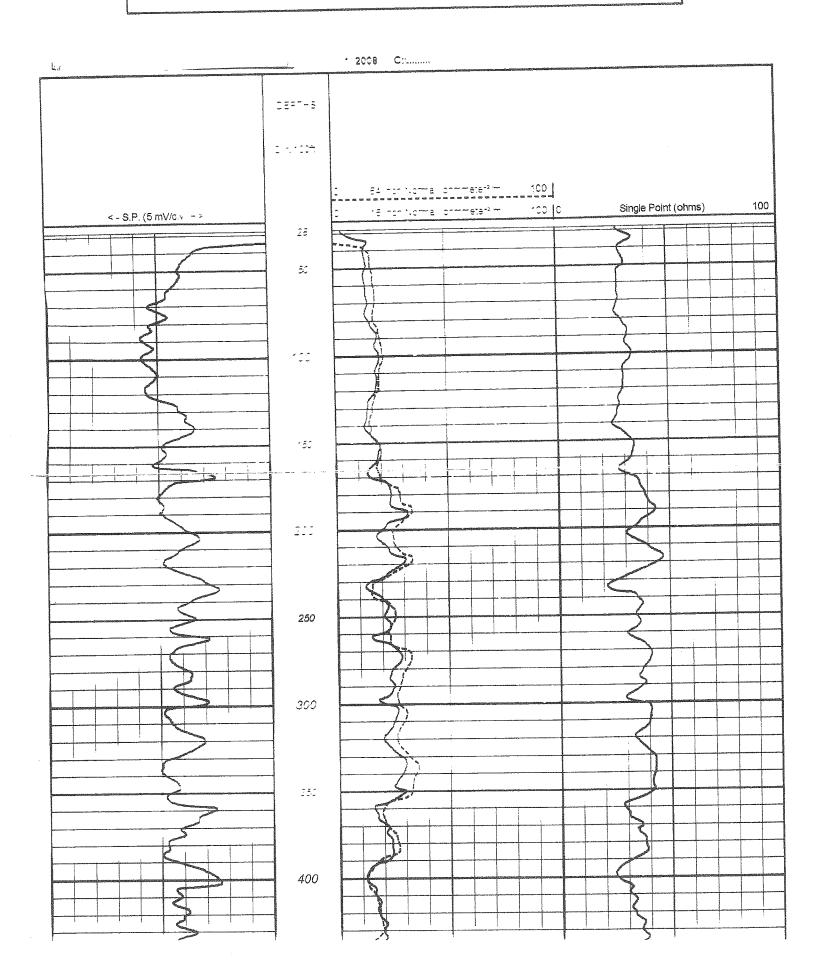
<u> </u>	=M	Or	100

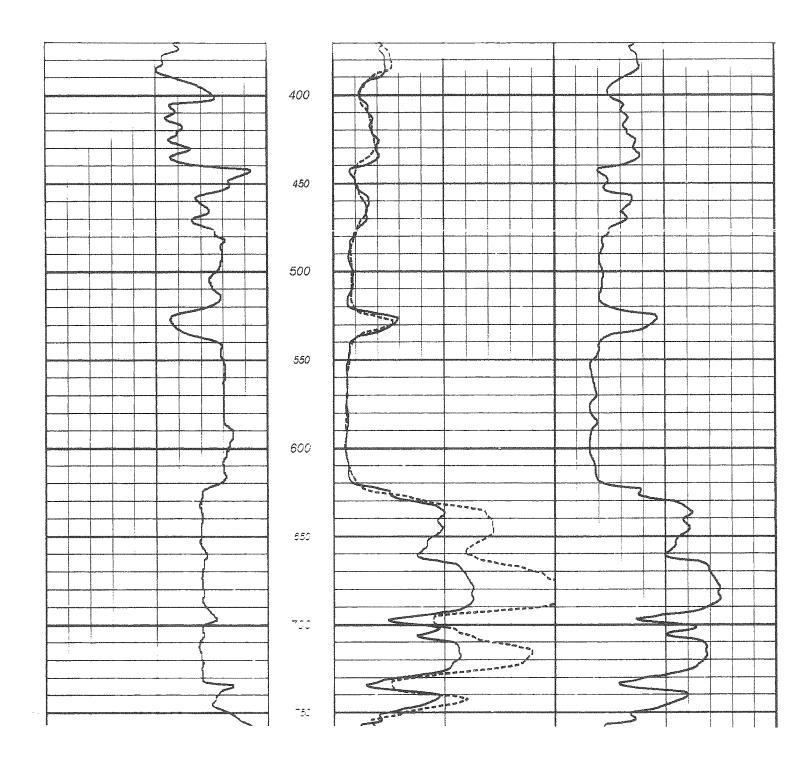
520	1 Woodmere					A 93313 actor's L				-(800)	445-9914	1	
				E	LEC	TRI	C L	.og					
FILING N	227	PANY _											
	FIELD	_	Core	oran									Š.
	STAT	E _	Cali	fornia	i		_col	YTNL	Kings				
JOB NO 9353	1350	ox 2 Mi S				on Dirt 5			19° 33' 16.8''		OTHER SER None		
Log Meas	nt Datum: sured From: leasured From	Grou	nd Le	evel		, 0	_, El	ev	erm. Datun	_ Ft.	Elev.: K.E		Ft. Ft. _Ft.
Run		One			T			T		_			-0.7
Date		May.	20. 2	800				-				-	
Depth-Driller					Ft			Ft		F			Ft
Depth-Logger		— Ft			Ft			Ft		F			Ft
Contract of the property of the last	ed Interval	1	1 Ft			Ft				F			Ft
	jed Interval		-		Ft			Ft		F			Ft
Casing-Dr	-	32 In @ 40 Ft		Ft	In @		Ft	In @		Ft In @		Ft	
Casing-Lo			In @		Ft	In		Ft	In @	F	1	In @	Ft
Bit Size	-	17.5	6		In		6	In		Ir			In
Time On E	Bottom	9:30											
Type Fluid	d in Hole	Bento	onite										
Density	Viscosity												
рН	Fluid Loss				ml			ml		m	1		m
Source of S	Sample	Pit											
Rm @ Meas	sured Temp.	13.2	@	75	°F	@		°F	@	0	-	@	°F
	sured Temp.	10.6	@	75	°F	@		°F	@	0	=	@	°F
	sured Temp.		@		°F	@		°F	@	9	-	@	°F
Source Rn												Ĭ	
Rm @ BHT			@		°F	@	1	°F	@	9	=	@	°F
	e Circulation	3			Hr			Hr		H			Н
Max. Rec.					°F			°F			-		°F
Van No.	Location	L-22		Bfld	-								
Recorded	Ву	Craig	Corl	bell									
Mitnesser	A STATE OF THE STA												





GEOPHYSICAL WELL LOGS





215/22E 3

_/	1
36	1:
3	1

	5201 Woodmere Drive, Bakersfield, CA 93313—www.welenco.com-(800) 445-9914	eld, CA S	vaniant Cherry	velenco.com-	(800) 445-90	914	
5201 Woodme	California Cont	O LATABI	Drive, Bakersheld, CA 93313— www.werenco California Contractor's License No. 722373	722373			7
	岀	ECT	ELECTRIC LOG	6			
FLUNG NO.	COMPANY		-10-24				
WELL	.: 1						
FIELD	Corcoran						
STATE	re California		COUNTY	Kings			Τ.
Approx.	LOCATION: Approx. 5 Mi. N. of dirt Quebec and dirt 7th	Duebec a	nd dirt 7th		None	OTHER SERVICES: None	
JOB NO.	10 Co to 050		7. 27 ff	* 14 95 95 74 4*	WEDNAM- Mt. Diablo	1. Diable	
SEC. 28		5	11 0		Et Flev KB	KB	ă
Permanent Datum	Ground Level		0 Ft Ahow	Ft Ahove Perm Datum		D.F.	ď
Drilling Measured From	Ground Level	1	1			G.L.	Œ,
	One	L			-		T
	Jun. 12, 2008	L					
Depth-Driller		Œ	R		α		ď
Depth-Logger	,	F	Œ		Œ		Œ
Top Logged Interval	, ,	Æ	Ft		Œ		Œ
Btm. Logged Interval		H	R		Œ		Œ
Casing-Driller		F	In @ Ft	9 11	Œ	E (0)	Œ
Casing-Logger	In @ 40	F	In @ R	E u	æ	9	Œ
Bit Size		lu	In		S		=
Time On Bottom	15:15				-		
Type Fluid In Hole	Polybore				1	-	T
Density Viscosity					+	+	T
Fluid Loss		E	Tal.		E	+	E
Source of Sample		+			+		T
Rm @ Measured Temp.	@ 75	jr.	. @		it.	0	-
Rinf @ Measured Temp.	11.2 @ 75	Į.	÷.	9	ů.	0	F
Rinc @ Measured Temp.	6	ū.	-F	0	UL.	0 -	T.
Source Rmf Rmc					1	-	1
@ ВНТ	8	ĮL.	- E	0	<u>u</u>	(3)	1
Time Since Circulation	60	±	±		ž		2
Max. Rec. Temp.		j.	7		Ĭr.		4
Van No. Location	L-23 Bfild					_	
Recorded By	Craig Corbell				+		1

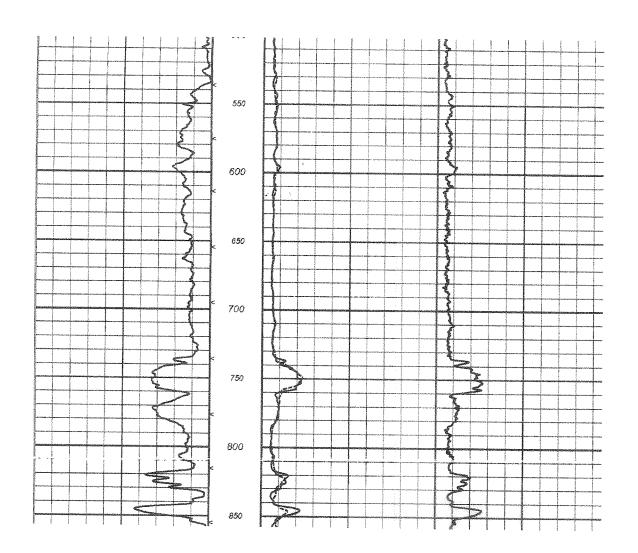
Miscellane Information Arecretional GPS accurate to 4-.45 test set for Datum NADZI was used to calcutate Lutitude, Longitude & Elevation values. The Section, Township, and Range then determined using the TRS program (TRS accuracy to not guarantees). The TRS program converts Lutitude and Longitude to Section, Township, and Range. The NOTICE at the hotform of this heading also applies.

GEOPHYSICAL WELL LOGS

NOTICE

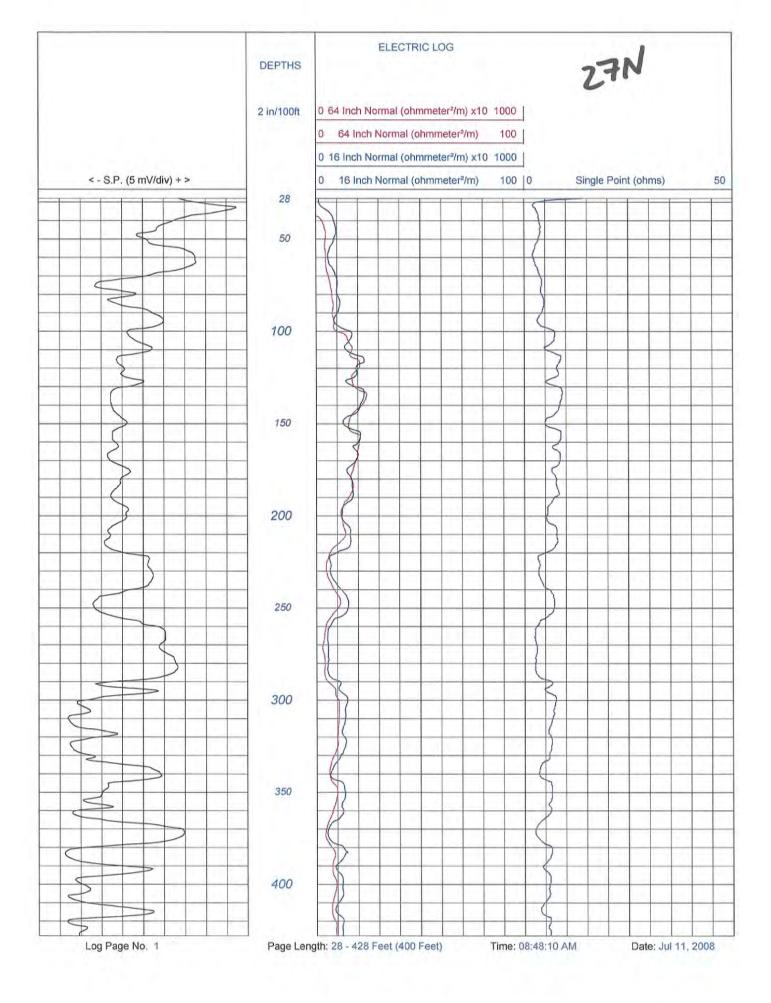
All interpretations are opinions based on inferences from electrical and other measurements and we do not guarantee the accuracy or correctness of any verbal or written interpretation, and we shall not, except in the case of gross or willful negligence on our part, he liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by one of our officers, agents or employees. These interpretations are also subject to our General Terms and Conditions as set out in our current Price Schedule.

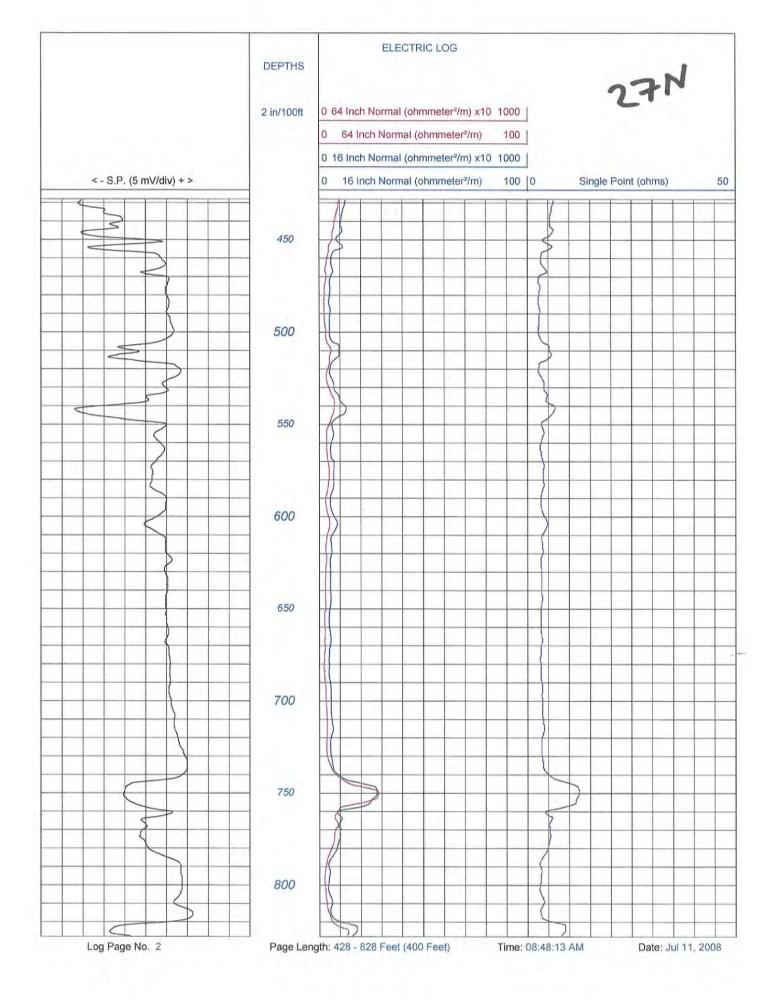
550



ZISIZZE ZAN

520	1 Woodme					CA 9331 tractor's				(800)	145-9914	
				100	THE REAL PROPERTY.	CTR	OF REAL PROPERTY.	The same				
FILING N												
	co	MPANY_	_	_				_				_
	WE	LL _	-	-								_
	FIE	1.0	Cor	cora	n							
	11 24		Cal	iforni	а			i ii ima	Kings			_
	10.5	ATE -	- Odi		-		co	UNTY_	Tilligo			-
JOB NO	The					ris and Av					THER SERVICES: None	
9576	SEC:_	27_TWP:	215	RGE:	22E L	AT.: 36° 3' 5	66.0"	LONG.: 1	19° 35' 22.0"	MERIDIAN	Mt. Diablo	
Permaner	nt Datum:	Grou	and L	evel			, E	lev		Ft. E	lev.: K.B	Ft.
Log Meas	sured From:	Grou	ınd L	evel		, 0	Ft.	Above F	Perm. Datun	1	D.F	Ft.
Drilling M	leasured Fro	m: Grou	and L	evel		- 30					G.L	Ft.
Run		One										
Date		Jul.	10, 2	800							-	
Depth-Dril	ller	-			Ft			Ft		Ft		Ft
Depth-Log	gger	T			Ft			Ft		Ft		Ft
Top Logge	ed Interval	30	_		Ft			Ft		Ft		Ft
Btm. Logg	ged Interval				Ft			Ft		Ft		Ft
Casing-Dr	riller	32	In @	40	Ft	11	n @	Ft	In @	Ft	In @	Ft
Casing-Lo	ogger			30	Ft	li li	n @	Ft	In @	Ft	In @	Ft
Bit Size		17.5			In			In		in		In
Time On B	Bottom	21:3	0									
Type Fluid	d In Hole	Wate	er									
Density	Viscosity											
рН	Fluid Loss				ml			ml		m		m
Source of S	Sample	Pit										
Rm @ Meas	sured Temp.	4.5	@	75	°F	6	a)	°F	@	°F	@	°F
	isured Temp.	3.6	@	75	°F		<u> </u>	°F	@	°F		°F
	asured Temp.		@		°F		<u>a</u>	°F	@	°F		°F
Source Rr		Mea	_						Ĭ			
Rm @ BHT			@		°F	6	æ	°F	@	°F	@	°F
	ce Circulation	3	-		Hr	,		Hr		Н		Н
Max. Rec	. Temp.				۰F			°F		°F		°F
Van No.	Location	L-16		Bfle	_			-				
Recorded				cksor	-							
1064		***	100		-		_					



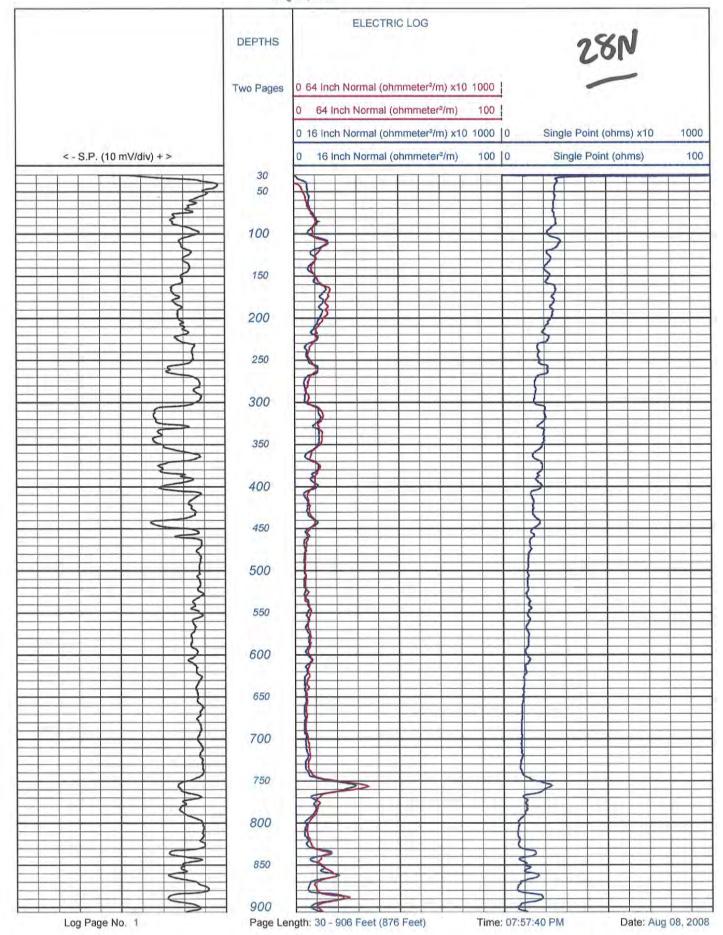


215/22E 28N

welenco

5201 Woodmere Drive, Bakersfield, CA 93313-- www.welenco.com--(800) 445-9914
California Contractor's License No. 722373

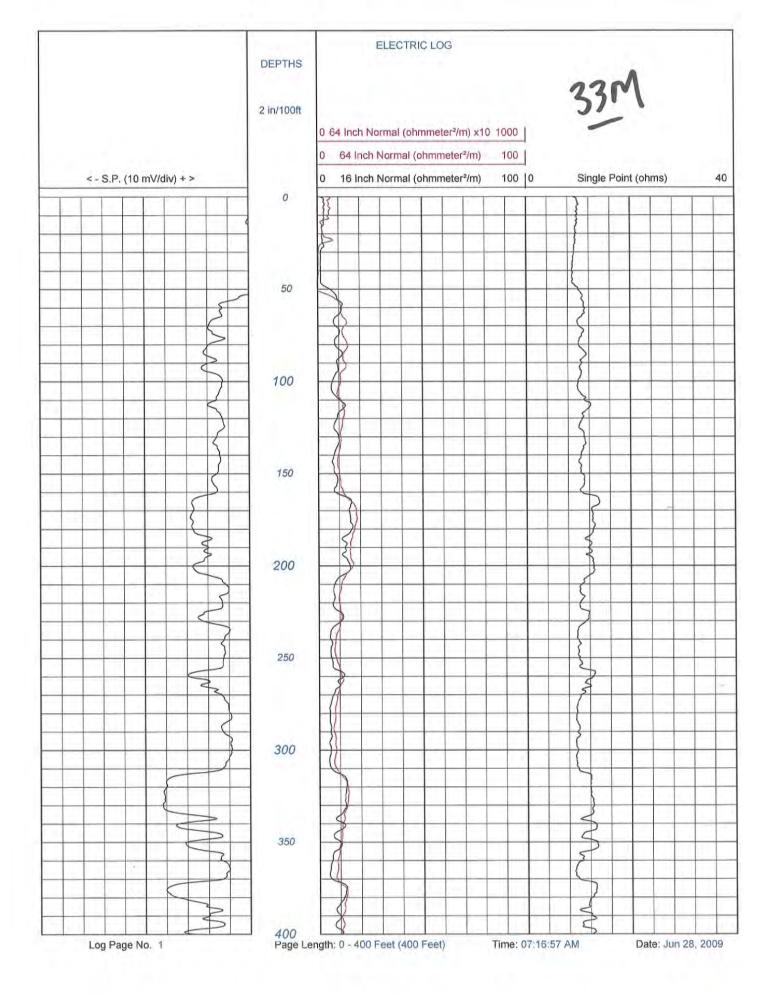
1.00	111 (12/27)	Ca	lifornia	Cont	ractor's Lice	nse No	. 722373	1000		
			E	LE	CTRIC	LOC				
FILING NO.	COM WELI FIELD STAT	D	Corcorar			DUNTY		Готн	ER SERVICES:	
JOB NO. 9778	North	of Paris			r.: 36° 4' 4.5"	LONG.:	119° 36' 27.0"	No	ne	
Permanent I Log Measur Drilling Mea	ed From:	Groun	d Level d Level		-	lev . Above	177 Perm. Datun		v.: K.B D.F G.L 177	Ft.
Run		One	8, 2008						0.11	
Depth-Driller Depth-Logge		_2770		Ft Ft		Ft Ft		Ft Ft		F
Top Logged Btm. Logged	Interval	40		Ft Ft		Ft		Ft		F
Casing-Drille	r		n @ 40	Ft	In @	Ft	In @	Ft	In @	F
Casing-Logg Bit Size		17.5	n @ 38	Ft In	In @	Ft In	In @	Ft In	In @	- F
Time On Bot Type Fluid In Density		19:00 Gel							i	
pH I Source of Samp	Fluid Loss ple	Pit		ml		ml		ml		n
Rm @ Measure Rmf @ Measure		5.1 4.1	@ 75 @ 75	°F	@	°F	@	°F	@	0
Rmc @ Measur Source Rmf	ed Temp.	Meas	@	°F	@	°F	@	°F	@	0
Rm @ BHT Time Since C	COLUMN TO SERVICE	5.0	@	°F Hr	@	°F Hr	@	°F	@	ŀ
Max. Rec. Te	ocation	N/A L-16	Bfld			°F		°F		0
Recorded By Witnessed B		David Rick C	Jackson							_

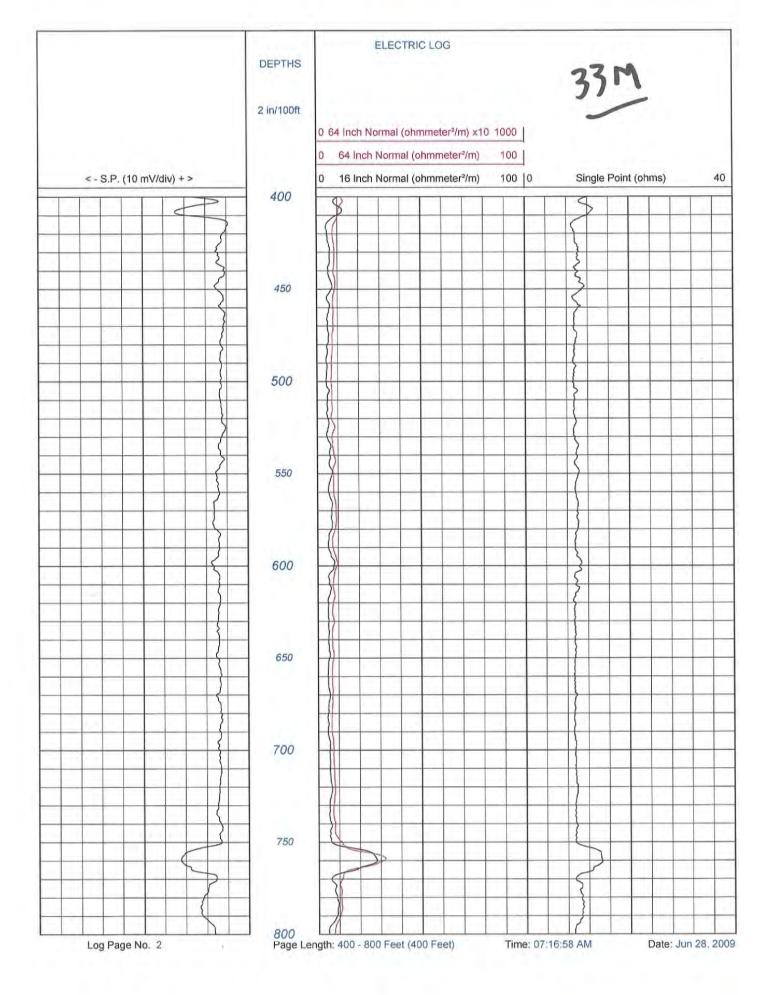




		-		
1	 14	IOI	en	00
				LU

520	1 Woodmer				A 93313 actor's Lic		enco.com(8	00) 44	5-9914	
		08		2000	TRIC	NAME OF STREET	The second second			
FILING I	NO.	-	1						_	
112.1101		PANY_								_
	WEL									
		5 5	Corcorar							=
	FIEL	<u> </u>				177.77	16.171			-
	STA	TE _	Californi	a		COUNTY_	Kings	-		-
	LOCA	TION:							ER SERVICES:	
	Dirt 8	3th betwee	en Paris	and Qu	ebec			No	ne	
	11									
JOB NO 1170										
1170	SEC: _3:			ZE LAT			119° 36' 26.1" ME		1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
	nt Datum:		d Level		~		1	Ft. Ele	v.: K.B	
	sured From:		d Level		_ , _ 0 _ 1	Ft. Above	Perm. Datum		D.F	
	leasured Fron		d Level	_					G.L	Ft.
Run		One		_						
Date		Jun. 2	8, 2009			-				
Depth-Dri			-	Ft!		Ft		Ft		Ft
Depth-Log		-		Ft		Ft		Ft		Ft
	ed Interval	_ 0	_	Ft		Ft Ft		Ft		Ft Ft
	ged Interval	32	50				7.4			
Casing-Do			In @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Bit Size	ogger	17.5	In @ 50	Ft	In @	Ft In	In @	Ft In	In @	Ft In
Time On I	Bottom	05:45	AM					- 10		- 119
Type Fluid	7.777.11	Gel								
Density	Viscosity									
рН	Fluid Loss			ml		ml		ml		ml
Source of S	Sample	Tank								
Rm @ Meas	sured Temp.	5.9	@ 75	°F	@	°F	@	°F	@	٥F
Rmf @ Mea	sured Temp.	5.3	@ 75	°F	@	°F	@	°F	@	٩F
Rmc @ Mea	sured Temp.		@	°F	@	°F	@	۰F	@	۰F
Source Rr	nf Rmc	meas								
Rm @ BHT			@	°F	@	°F	@	°F	@	°F
-	ce Circulation	5.0		Hr		Hr		Hr		H
Max. Rec		N/A		°F		°F		°F		°F
Van No.	Location	LV-1	Bflo							
Recorded		Dan If								
Witnesse	II HV	Victor	Olveda							

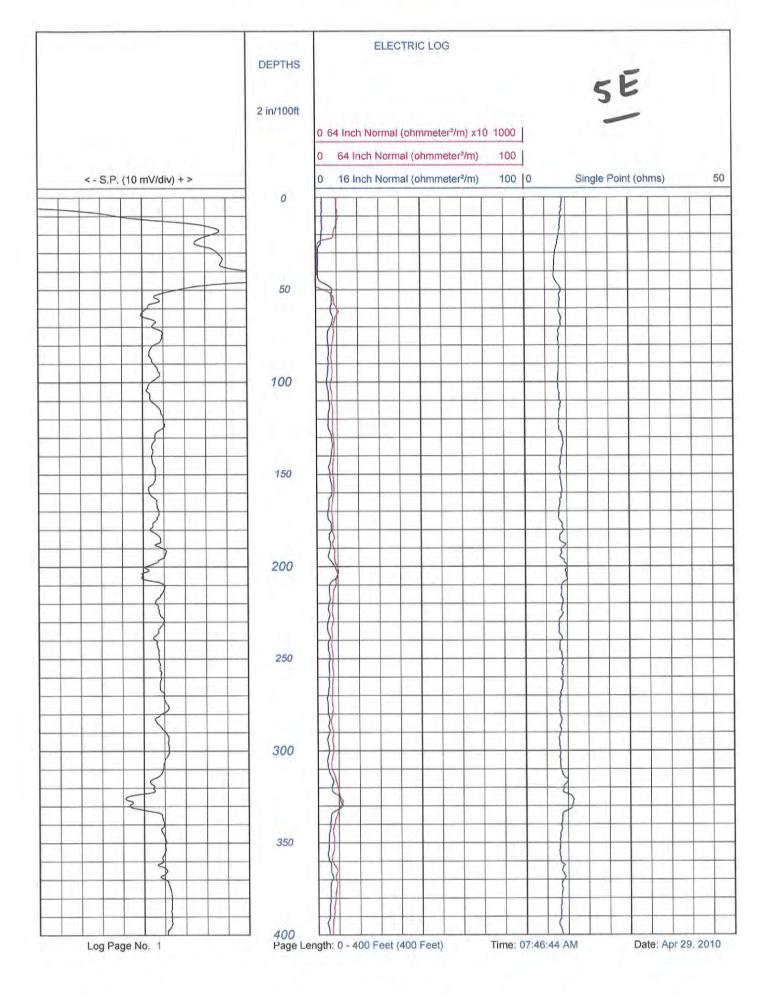


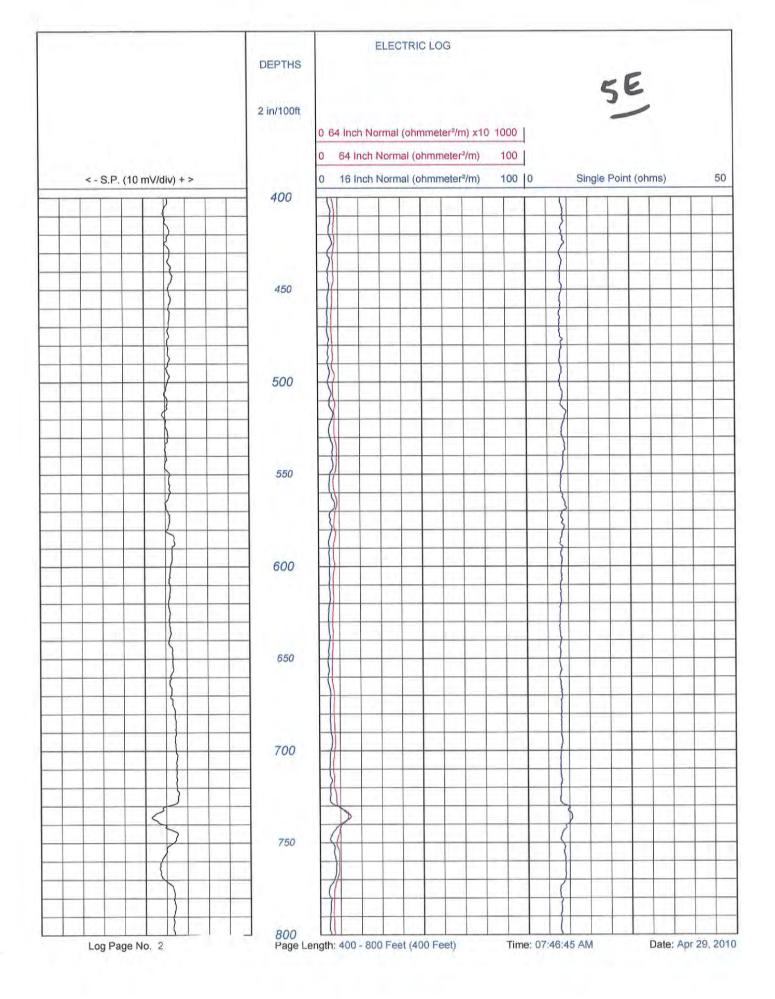


225/22E 5E

_	III	
we	lon	00
-vv e	IEII	

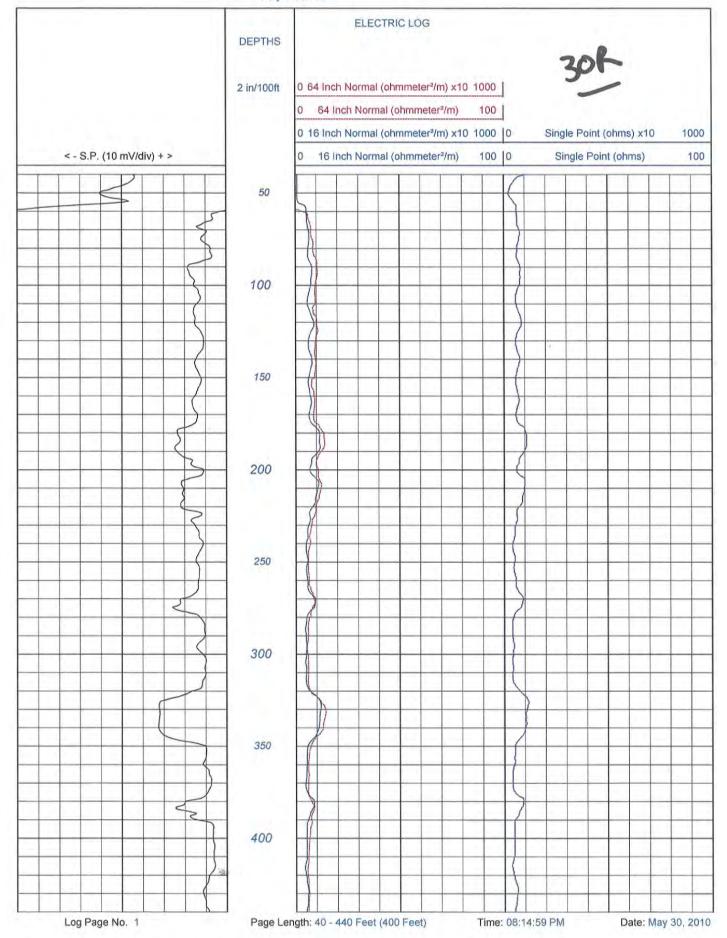
520	voodmer				ractor's Licer		ienco.com(80), 722373	0) 44:	0-9914	
			1	100	CTRIC L	THE REAL PROPERTY.				
FILING I		D	Corcorar		co	UNTY	Kings	10000	ER SERVICES:	
JOB NO 1333	o.	TWP:_22	S RGE: 2		T.: 36° 2 ' 37.7"	LONG.:	f Redding Ave.	No		
Log Meas	nt Datum <u>:</u> sured From: leasured Fron	Groun	d Level d Level d Level		, E , Ft.		Perm. Datum	. Ele	v.: K.B D.F G.L165	_Ft. _Ft. _Ft.
Run		One				T				
Date		Apr. 29	9, 2010							
Depth-Dri	ller	1.4		Ft		Ft		Ft		Ft
Depth-Log	gger	R.	100	Ft		Ft		Ft		Ft
Top Logg	ed Interval	U .		Ft		Ft		Ft		Ft
Btm. Logg	ged Interval	1		Ft		Ft		Ft		Ft
Casing-D		32	In @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Casing-Lo	ogger		In @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Bit Size		17.5		In		In		In		In
Time On	Bottom	5:20 A	IVI							
Type Flui	d In Hole	Bento	nite							
Density	Viscosity		T							
рН	Fluid Loss			ml		ml		ml		mi
Source of S	Sample	Tank		- Y -						
Rm @ Mea	sured Temp.	4.1	@ 75	°F	@	°F	@	°F	@	۰F
Rmf @ Mea	sured Temp.	3.8	@ 75	°F	@	°F	@	°F	@	°F
Rmc @ Mea	sured Temp.		@	°F	@	°F	@	°F	@	۰F
Source Rr	nf Rmc	meas	Ĭ		Ĭ		Ĭ			
Rm @ BH1			@	°F	@	°F	@	°F	@	°F
	ce Circulation	5.0		Hr		Hr		Hr		Н
Max. Rec	. Temp.	N/A		°F		°F		°F		°F
Van No.	Location	LV-1	Bflo							
Recorded	Ву	Dan Ih	de							
Witnesse	d By	Victor	Olveda							

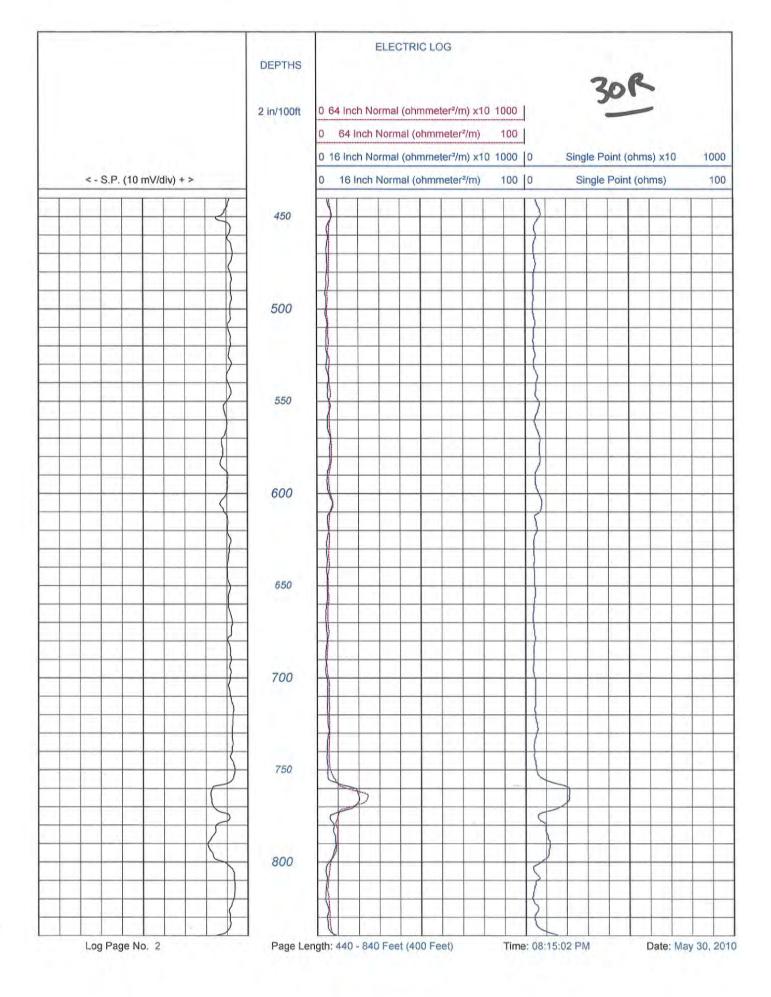






520	1 Woodme				CA 93313 w ractor's Lice		enco.com(80 . 722373	0) 445	5-9914	
			Y 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	A Name	CTRIC I	SKUK	1000			
FILING I		MPANY								
	WE		Corcora	1	_					
	11 /45		Californi	а	cc	UNTY_	Kings			
	3 M	ATION: iles West o Mile North		9 6				Not	ER SERVICES:	
JOB NO 1341		29_TWP;_21	S_RGE:_	22E LA	т.: 36° 3' 56.0"	LONG.:_1	119° 37' 31.0" MERI	DIAN.:_	Mt. Diablo	
Permane	nt Datum:		d Level		, E	lev	Ft	Elev	v.: K.B	_Ft.
Log Meas	sured From:	Drillin	g Table		6Ft.	Above	Perm. Datum		D.F	_Ft.
Drilling N	leasured Fro	m: Drillin	g Table						G.L	_Ft.
Run		One								
Date		May. 3	0, 2010							
Depth-Dri	ller			Ft		Ft		Ft		Ft
Depth-Log	gger			Ft		Ft		Ft		Ft
Top Logg	ed Interval	56	*	Ft		Ft		Ft		Ft
Btm. Logg	ged Interval			Ft		Ft		Ft		Ft
Casing-D	riller	32	In @ 40	Ft	In @	Ft	In @	Ft	In @	Ft
Casing-Lo	ogger		In @ 56	Ft	In @	Ft	In @	Ft	In @	Ft
Bit Size		17.5		In		In		In		In
Time On I	Bottom	17:12								
Type Fluid	d In Hole	Water								
Density	Viscosity				- 7/1/-					
pH	Fluid Loss			ml		ml		ml		m
Source of S	Sample	Pit								
Rm @ Meas	sured Temp.	7.1	@ 75	°F	@	°F	@	°F	@	°F
Rmf @ Mea	sured Temp.	7.1	@ 75	°F	@	°F	@	°F	@	°F
Rmc @ Mea	asured Temp.		@	°F	@	°F	@	°F	@	°F
Source Rr	nf Rmc	Meas								
Rm @ BHT			@	°F	@	°F	@	°F	@	٥F
Time Sind	ce Circulation	3.5		Hr		Hr		Hr		Н
Max. Rec	. Temp.			°F		°F		°F		۰F
Van No.	Location	L-15	Bflo	1						
Recorded	Ву	David	Jackson							
Witnesse	d Bv	Victor								



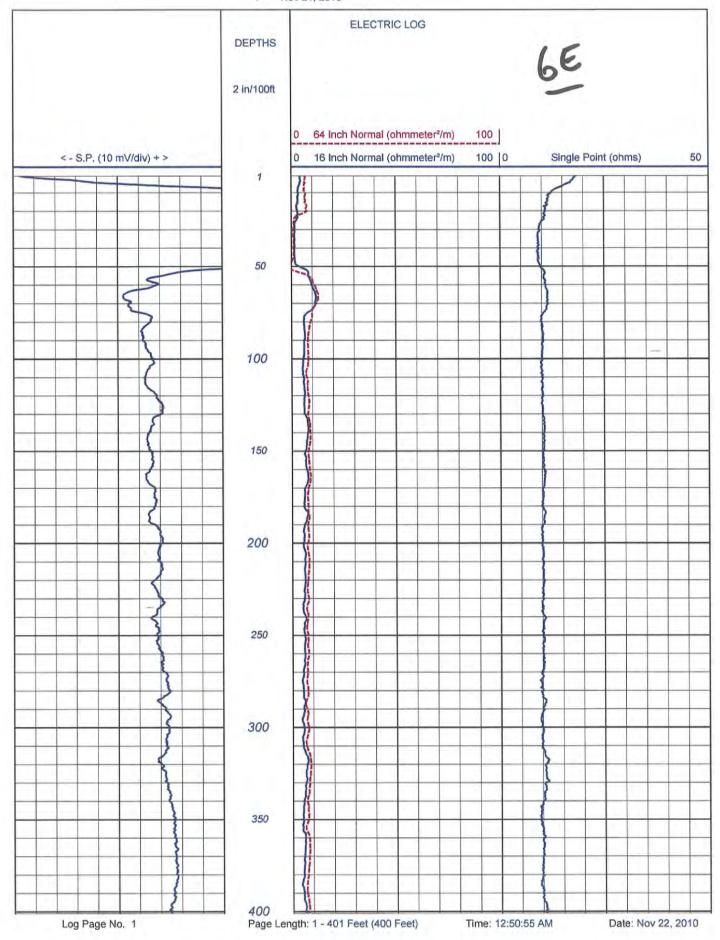


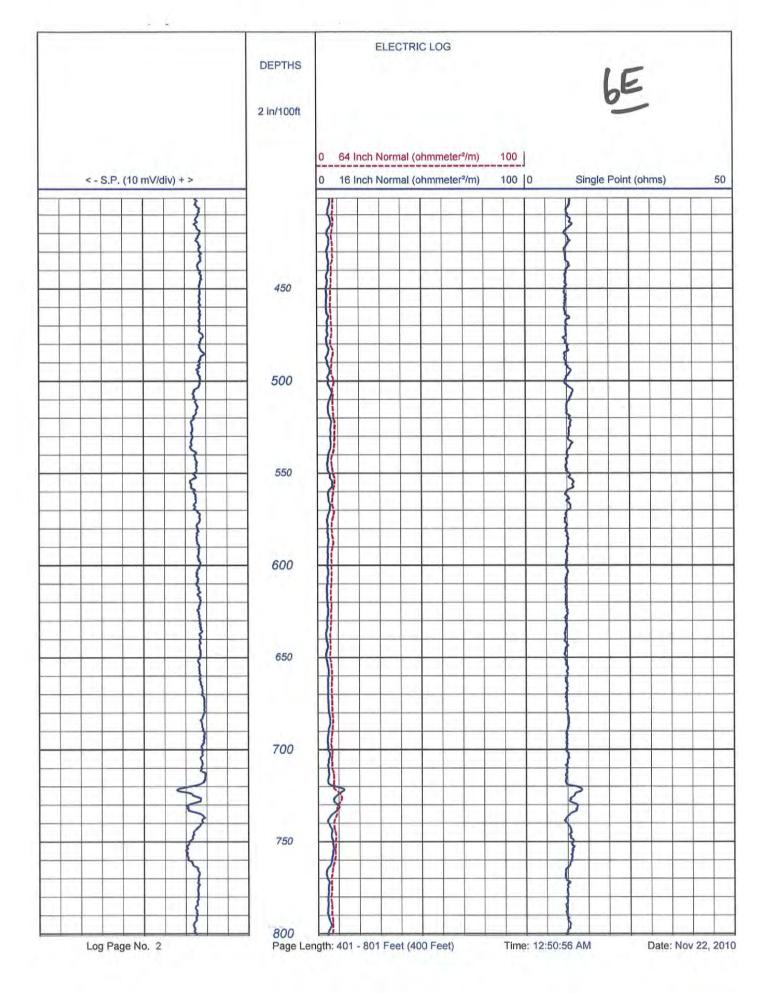
225/22E 6E

we	OB	00
- WV (

520	71 Woodille				actor's Lice		. 722373	(000) 44	0 001.4	
			E	LEC	CTRIC	LOC				
FILING I		N. INSE		METS-100	0.1-07-	4.4.				
	CON	MPANY _			+4	+ 34:				-
	WEI	L .			7					-
	FIEL	D	Corcora	n						
	2.5		Californi		241	1223	Kings			
	STA	111	Camoriii	a	cc	YTNUC	Killys			-
	East of P	ATION: side of 1 aris.	0th Ave.	on Nort	h bank of car	nal, 1.5	miles South	No	HER SERVICES: One	
1714	2.0	TWP: 2	2S RGE: 2	22E LAT	: 36° 2 ' 38.0"	LONG.:	119° 38' 31.4"	MERIDIAN.:	Mt. Diablo	
Permane	nt Datum:		nd Level						ev.: K.B	Ft.
Log Meas	sured From: leasured Fro		nd Level nd Level		-		Perm. Datu		D.F G.L 175	Ft. Ft.
Run		One						= 1		7.4
Date		Nov.	21, 2010			- 5.1				
Depth-Dri	ller	E		Ft		Ft		Ft		Ft
Depth-Log	gger			Ft		Ft		Ft		Ft
Top Logg	ed Interval	0		Ft		Ft		Ft		Ft
Btm. Logg	ged Interval			Ft		Ft		Ft		Ft
Casing-D	riller	32	In @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Casing-Lo	ogger	32	in @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Bit Size		17.5		In		In		In		In
Time On	Bottom	10:30	PM							
Type Flui	d In Hole	Bento	onite							
Density	Viscosity									
рН	Fluid Loss	-		ml		ml		ml		m
Source of S	Sample	Tank								
Rm @ Meas	sured Temp.	12.8	@ 75	°F	@	°F	@	°F	@	٩F
Rmf @ Mea	sured Temp.	11.6	@ 75	°F	@	°F	@	°F	æ	°F
Rmc @ Mea	asured Temp.		@	°F	@	°F	@	°F	@	°F
Source Rr	mf Rmc	meas			T		Ĭ			
Rm @ BH1			@	°F	@	°F	@	°F	@	°F
	ce Circulation	5.0		Hr		Hr		Hr		Н
Max. Rec	. Temp.	N/A		°F		°F		°F		°F
Van No.	Location	LV-1	Bflo							
Recorded	Ву	Dan I	hde							
Witnesse		Victo	r Olveda							

Nov 21, 2010





				1	В
P A S U	PACIFIC		ELECTRIC LOG GAMMA-RAY	A-RA	≺ G
Job No. 16838	Company	9			
	Well	×			
	Field	CORCORAN			
File No.	County	TULARE	State	CA	
Location:				Other Services	vices:
1.5 MILES SOL GPS: N 360 02	ЛН OF INTERS 2.639' W 119o 36	1.5 MILES SOUTH OF INTERSECTION OF PARIS AND 8TH AVE GPS: N 36o 02.639' W 119o 36.492'	8TH AVE	NONE	
Sec.	Twp.	Rge.	e.		
Permanent Datum Log Measured From Drilling Measured From	m From	6T 6T 6T	Elevation 164 above perm. datum	164' atum	Elevation K.B. D.F. G.L.
Date		10-20-2012			
Run Number		ONE			
Depth Driller					
Bottom Logged Interval	Interval				
Top Log Interval	2	c			
Casing Driller		32" @ 67'			
Casing Logger		67'			
Bit Size		17.5			
Type Fluid in Hole	ole	BENIONIE			
pH / Fluid Loss	sity	NA A			
Source of Sample	ole	TANK			
Rm @ Meas. Temp	emp	8.2 @ 77F			
Rmf @ Meas. Temp	emp	8.2 @ 77F			
Rmc @ Meas. Temp	emp	MEASURE			
Rm @ BHT		N/A			
Time Circulation Stopped	n Stopped	1300			
Time Logger on Bottom	Bottom	1845			
Max. Recorded Temperature	Temperature	NA			
Equipment Number	nber	PS-3			
Location		S LA			
Witnessed By		1 OCHOWACIEN			
A DOCOCO CA					

All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Calibration Report

Database File Dataset Pathname 16838.db ELOG

Dataset Creation Sat Oct 20 18:49:26 2012

FLOG Calibration Report

Database File Dataset Pathname Presentation Format Dataset Creation

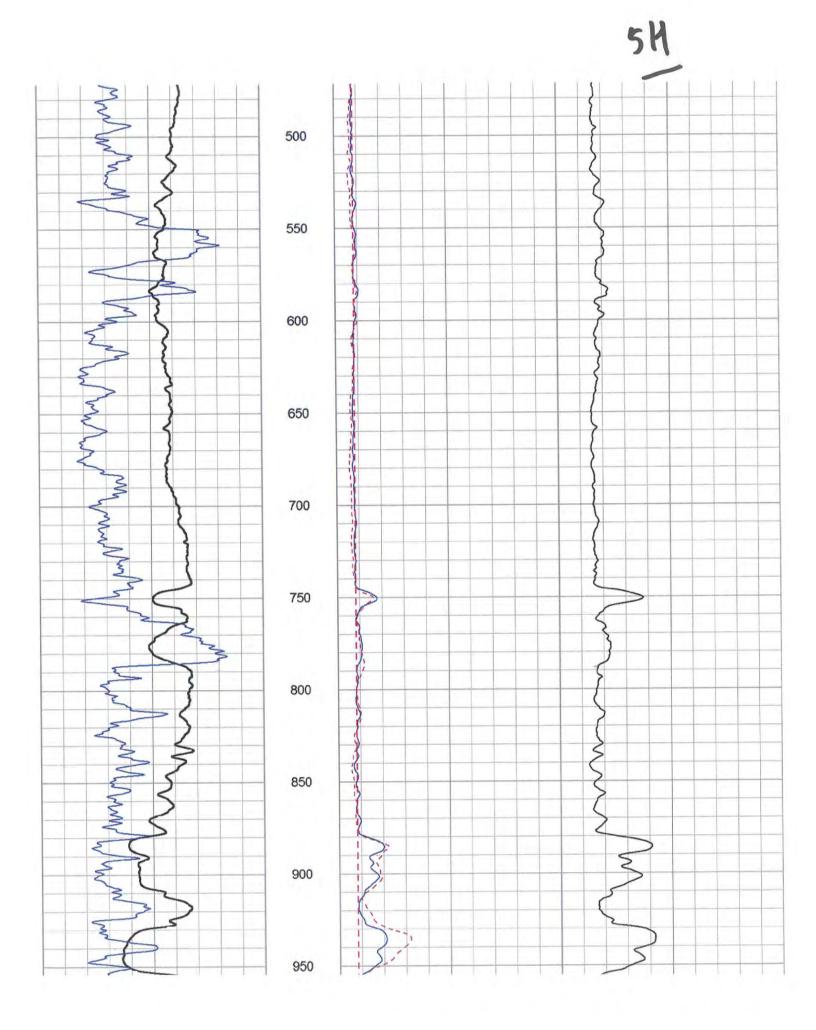
Charted by

16838.db ELOG.1 elog

Sat Oct 20 20:42:53 2012 Depth in Feet scaled 1:600



	SP (mV)	45	0		RSN (Ohm-m)	100	3	SPR (Ohm-m)	2
	Gamma-Ray (GAPI)	120	0		RLN (Ohm-m)	100			
			0		RMF (Ohm-m)	100			
			1-	100	RSN x 10 (Ohm-				
				100	RLN x 10 (Ohm-	-m) 1000			
7			111				/		
		50	1 /						
			J						
<		→		1			1		
	4	Surface	Casing	7			3		
<	35	10	0 _				3	5	
-	23			1:			1		-
-	55			1/2			1		+
+				1			1		
	12			1)					
		15	0				(
				1)					
	3)						1		
<	3)				<i>y</i>	
-	55	20	0 —	12:					+++
	56							3	
	2						1		\Box
	5			5					
	==2	25	0				_ {		
							{		
-	33			2			}	>	+
-	5 5						7		+++
-	SP → SP						1		+
+	2	30	0				1		\top
	5)						1		
	3-2-	Gamma-Ray					>		
	\$	R	MF -					→ SPR	1
-		35	0				{		+++
-	3								-
+	-3-			19	L PIN		1	>	
2	2		RSN -	1	H RLN				
	3	40	0	1			-	\$	
	52		_	}			5		
-	£ }			1:			1		+-
+	1		and a	1			1		+++
-	3			1					+++
+	3 3	45	0 -	1			>		111

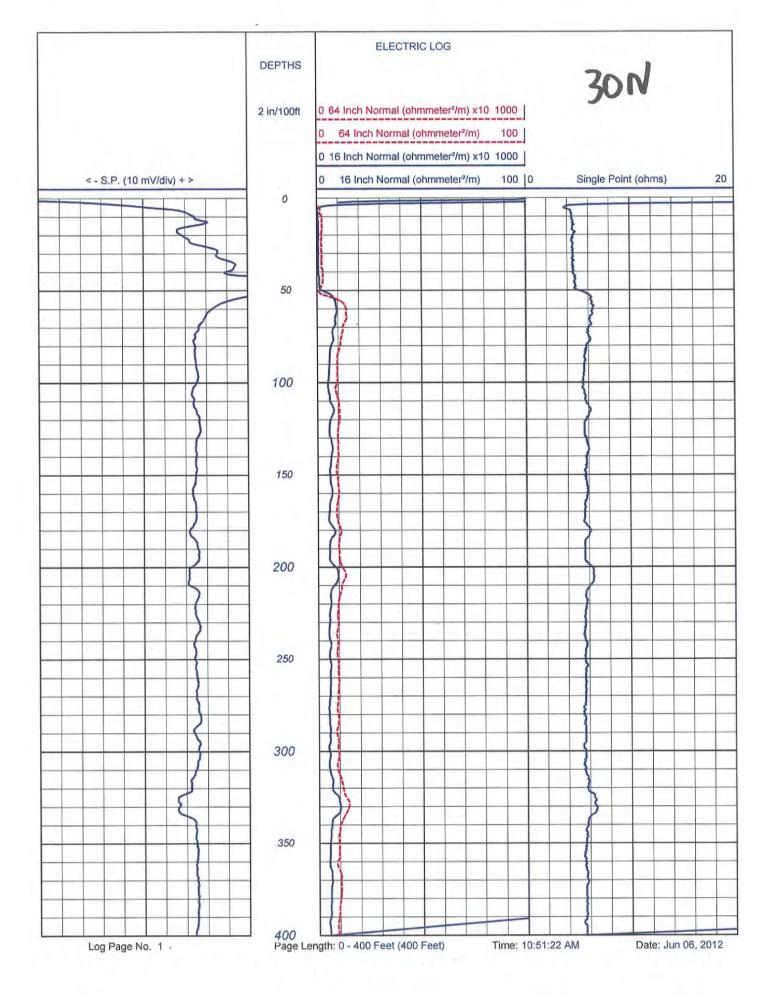


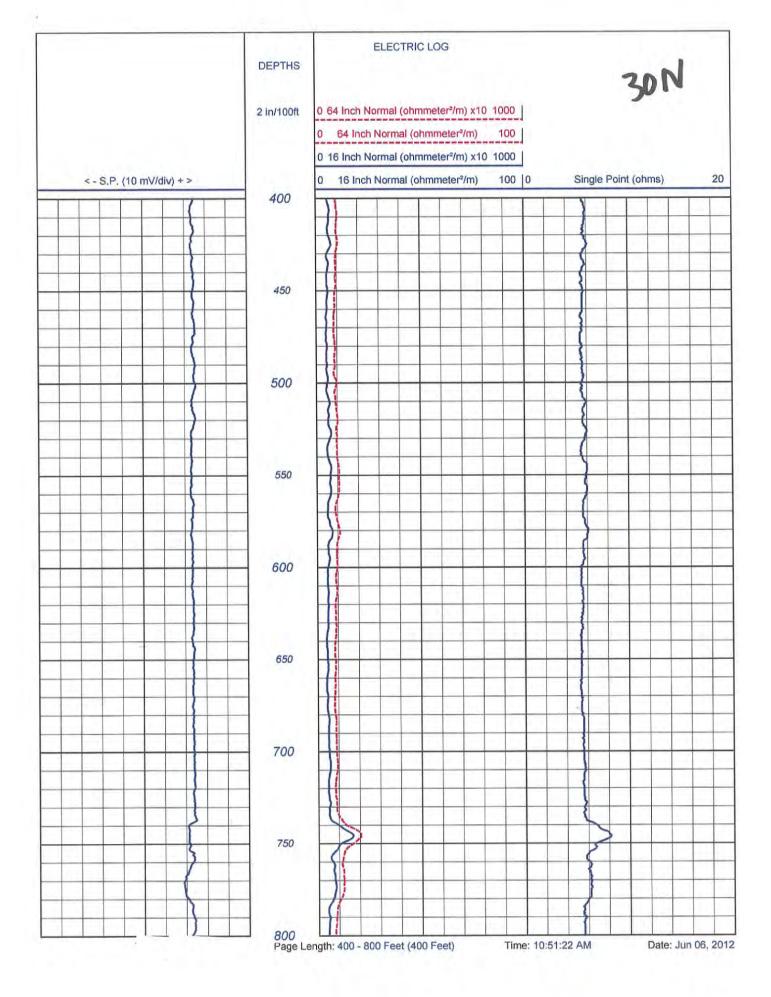


_						
_		re.	-	-	-	
_						
	WW					

5201 Woodmere Drive, Bakersfield, CA 93313-- www.welenco.com--(800) 445-9914

020		Cal	ifornia	Contra	ctor's Lice	se No	. 722373	,===/		
			Ε	LEC	TRICI	LOG				
FILING I	NO.			-	and the same	and the same				
	COM	IPANY _		-						÷
	WEL	L			_					3
	FIEL	D 0	Corcorar)						-
	1,853				W. J	Vinne				
	STA	TE	California	a	cc	UNTY	Kings	100	5558222	- 1
	LOCA 10th	TION: Ave. and F	Paris Av	а.				No	ER SERVICES: 1e	
JOB NO 1642)TWP:_215	RGE:	ZE LAT.	36° 3 ' 55.8"	LONG.:	119° 38' 36.2"	MERIDIAN.:_	Mt. Diablo	
Permanent Datum: Ground Level					, E	lev	160	_ Ft. Ele	v.: K.B	_Ft.
Log Measured From: Ground Level				, 0 Ft.	Above	Perm. Datur	n	D.F	_Ft.	
Drilling N	leasured Fron	n: Ground	Level			1,111			G.L. 160	_Ft.
Run One										
Date Jun. 06, 2012										
Depth-Driller				Ft		Ft		Ft		Ft
Depth-Log				Ft		Ft		Ft		Ft
Top Logg	ed Interval	0		Ft		Ft		Ft		Ft
Btm. Logg	ged Interval	0		Ft		Ft		Ft		Ft
Casing-D	riller		n @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Casing-Lo	ogger	32	n @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Bit Size		17 1/2		In		In.		In		In
Time On I	Bottom	9:00 Al	VI							
Type Fluid		Bentor	ilte				-			
Density	Viscosity									
pH	Fluid Loss			ml		ml		ml		mi
Source of S	Sample	Tank								
Rm @ Meas	sured Temp.		@ 75	°F	@	°F	@	°F	@	°F
Rmf @ Mea	sured Temp.	2.1	@ 75	°F	@	°F	@	°F	@	°F
Rmc @ Mea	asured Temp.		<u>@</u>	۰F	<u></u> @	°F	@	°F	@	°F
Source Rr	mf Rmc	meas								
Rm @ BH1			@	°F	@	°F	@	°F	@	°F Hi
	ce Circulation	5.0		Hr		Hr			Hr	
Max. Rec		N/A	1	°F		°F		°F		°F
Van No.	Location	LV-1	Bflo							
Recorded		Dan Ih	-							
Witnesse	d Bv	Victor	Olveda			- 1				

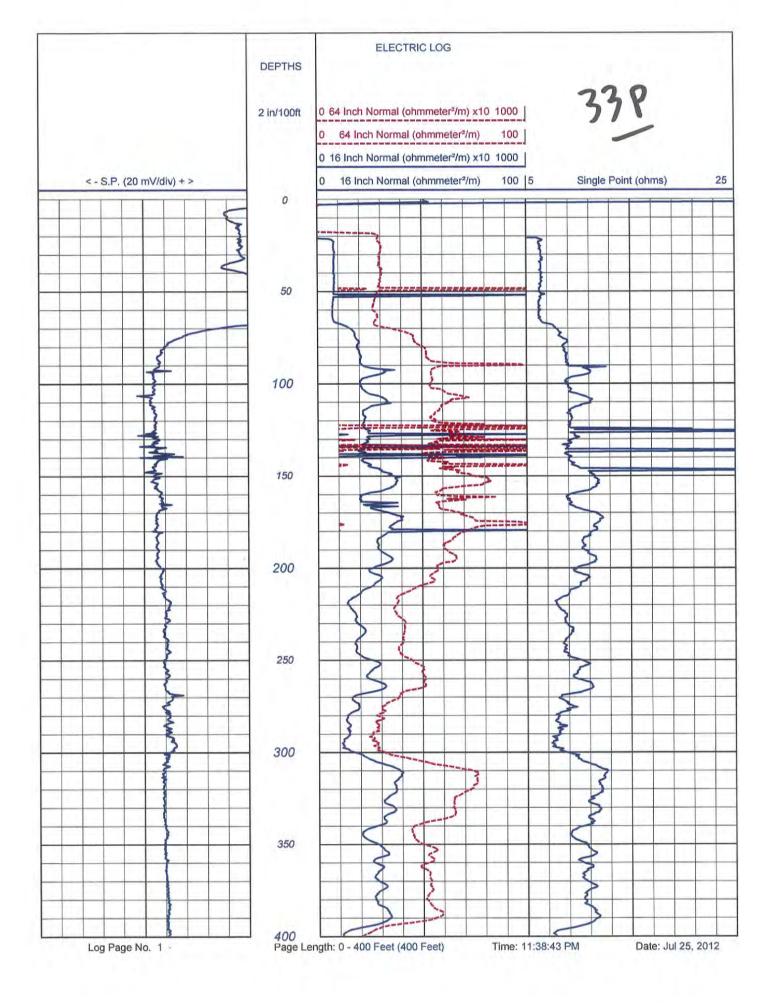


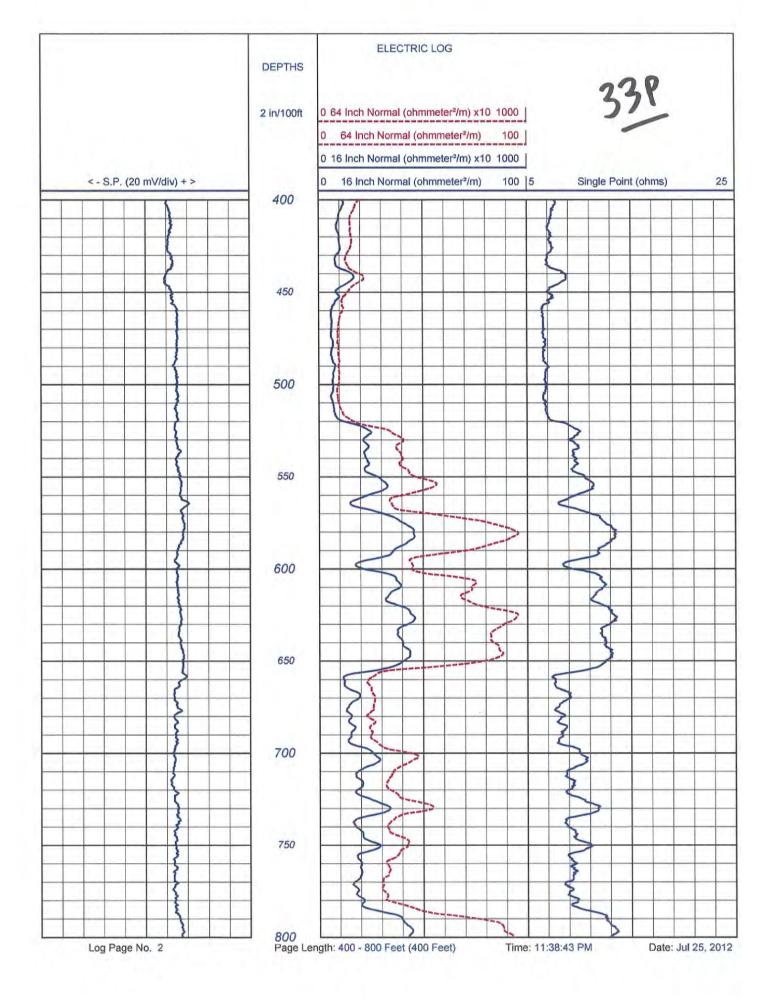


215/23E 33P

_	MI.	
14/0	OB	000
we		

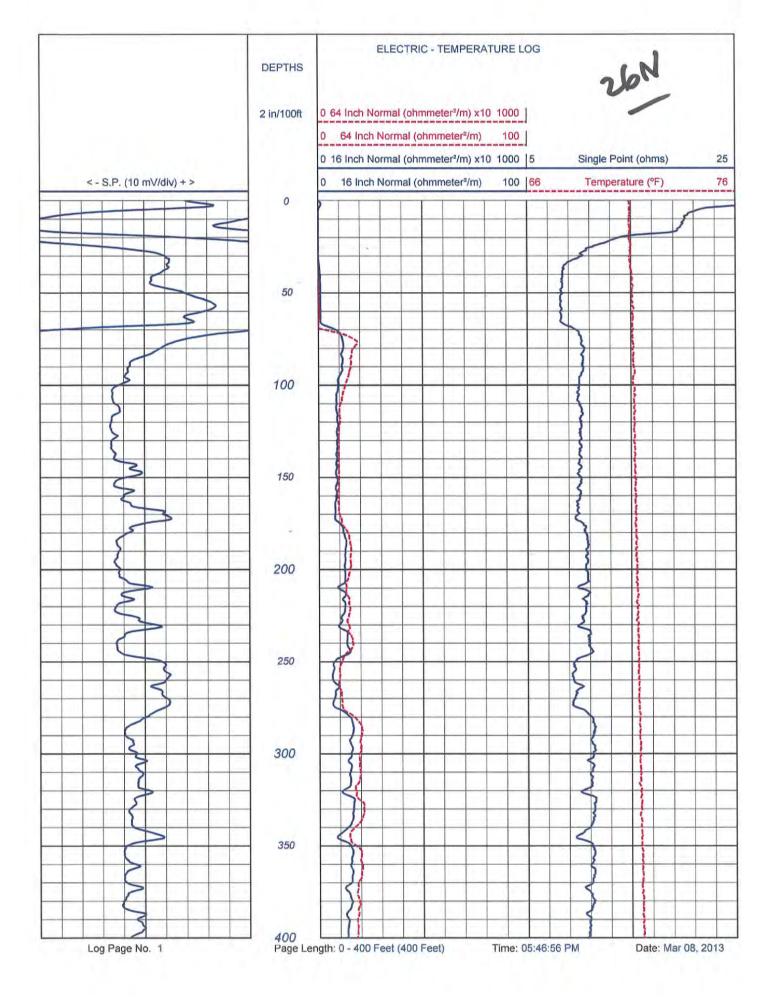
520	or woodiner				ctor's Lice		722373	JU) 445	-3314		
			THE OWNER OF THE OWNER, WHEN	The same of	TRIC	NAME OF STREET	The second second				
FILING		o date		and the same	The state of the s						
	COM	IPANY _								-	
	WEL	L	4 **							1	
	FIEL	D	Corcorar	1							
		7. 5	California	a		LILITA	Tulare				
	3.22	SIAIE				UNTY_	, 414.70	Lame			
		rox. 2 Mi.	East of H	wy 43 o	n the North S	Side of A	ve. 144	No	ER SERVICES: ne		
JOB N 1647		3_TWP: 2	1S_RGE:_2	23E_LAT.:	36° 3' 6.4"	LONG.:_1	19° 29' 16.8" MEF	RIDIAN.:_	Mt. Diablo		
Permane	nt Datum:	Groun	nd Level				F		v.: K.B	Ft.	
Log Measured From: Ground Level					, 0 Ft.	Ft. Above Perm. Datum			D.F	Ft.	
Drilling N	leasured From	m: Grou	nd Level			1 1 10	2000		G.L	Ft.	
Run		One									
Date		Jul. 25, 2012		1							
Depth-Driller			Ft			Ft		Ft	-	Ft	
Depth-Lo	gger		Ft			Ft		Ft		Ft	
Top Logg	ed Interval	0		Ft		Ft		Ft		Ft	
Btm. Logs	ged Interval			Ft		Ft		Ft		Ft	
Casing-D	riller	32	In @ 50	Ft	In @	Ft	In @	Ft	In @	Ft	
Casing-L	ogger	32	In @ 50	Ft	In @	Ft	In @	Ft	In @	Ft	
Bit Size		17.5		In		In		In	- 100	In	
Time On	Bottom	22:10									
Type Flui	d In Hole	Polyn	ner								
Density	Viscosity										
рН	Fluid Loss			ml		ml		ml		ml	
Source of S	Sample	Pit				- 11				770	
Rm @ Mea	sured Temp.	8.9	@ 75	°F	@	°F	@	°F	@	۰F	
Rmf @ Mea	sured Temp.	8.9	@ 75	°F	@	°F	@	°F	@	۰F	
Rmc @ Me	asured Temp.		@	°F	@	°F	@	°F	@	°F	
Source R	mf Rmc	Meas	Mea	s							
Rm @ BH1			@	°F	@	°F	@	°F	@	۰F	
Time Since Circulation		3.5		Hr		Hr		Hr			
Max. Rec	. Temp.			°F		°F		°F		°F	
Van No.	Location	L-23	Bfld								
Recorded	Ву	Craig	Corbell				·			-	
Witnesse	d By	Lenn	v Godwin								

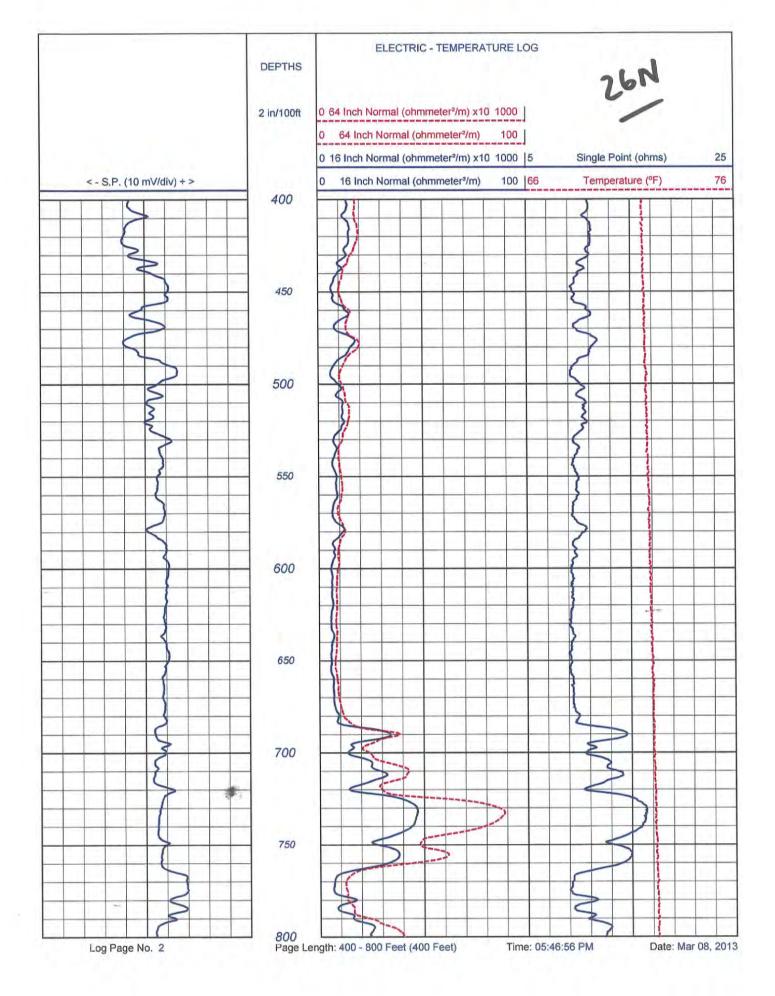




215/22E 26N

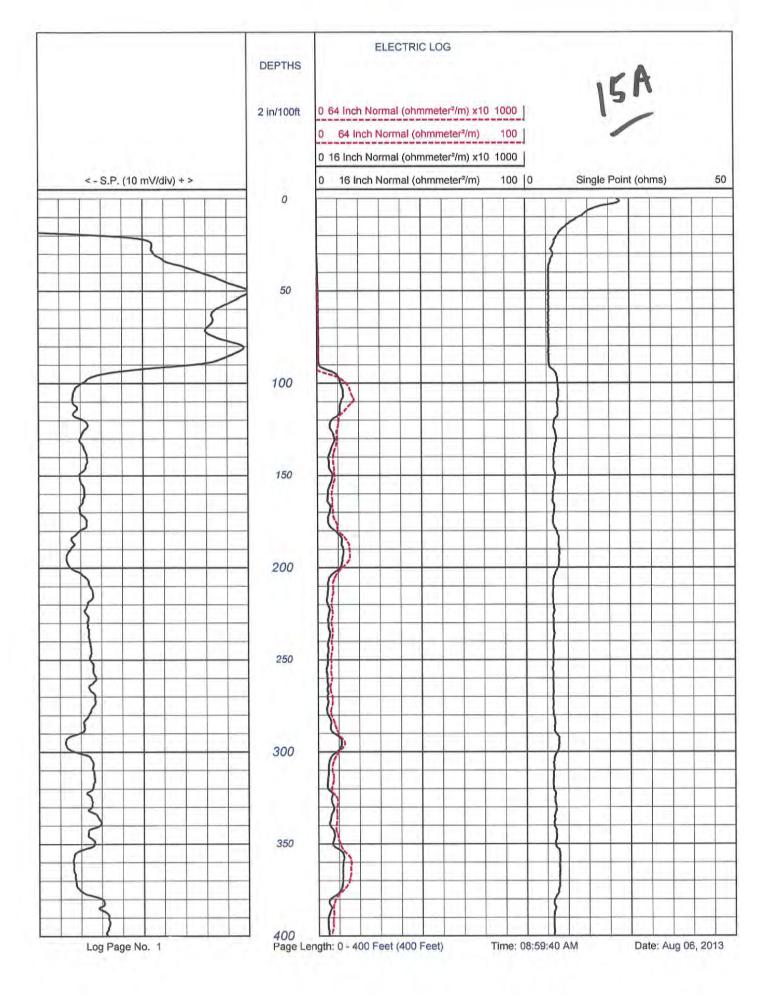
520	1 Woodmer				A 93313 w actor's Lice		lenco.com(800) 44	5-9914	
	E	100	Chicago da	THE REAL PROPERTY.	THE RESERVE OF THE PERSON	ALC: U	URE LO	OG		
FILING N		D170	TO THE YOU		THE PROPERTY OF	andone	E EV			
	COV	IPANY_	-							-
	WEL	L _								-
		-	Corcora	1						
	FIEL	.D _	- Lac day and			3.77	NO. INC.			_
	STA	TE _	Californi	a	cc	UNTY	Kings			
	LOCA	TION:					1201-11	ER SERVICES:		
	Nort	h side of	Paris Ave	3 M	iles East of 6t	h Ave	across from	No	ne	
		well yard		9 55 6		115.51				
JOB NO	D.									
1705	4 SEC: 2	6_TWP: 2	215 RGE:	ZZE LAT	r.: 36° 3 ' 56.8"	LONG.:	119° 33' 58.2" M	ERIDIAN.:_	Mt. Diablo	
Permane	nt Datum:	Grou	ind Level		. 8	lev	190	Ft. Ele	v.: K.B.	Ft.
Log Measured From:		Grou	Ground Level			0 Ft. Above Perm. Datum			D.F.	Ft.
			ind Level						G.L. 190	Ft.
Run	27838233	One				T				
Date		Mar.	08, 2013							
Depth-Dri	ller		Ft			Ft		Ft		Ft
Depth-Log			Ft		Ft			Ft		Ft
	ed Interval	0	Ft			Ft		Ft		Ft
Btm. Logg	ged Interval		Ft			Ft		Ft		Ft
Casing-Di	riller	32	In @ 69	Ft	In @	Ft	In @	Ft	In @	Ft
Casing-Lo	ogger	32	In @ 69	Ft	In @	Ft	In @	Ft	In@	Ft
Bit Size		17 1/	2	In		In		In		In
Time On I	Bottom	4:15	PM							
Type Fluid	d In Hole	Wate	er							
Density	Viscosity									
рН	Fluid Loss	1		ml		ml		ml		ml
Source of S	Sample	Tank	(
Rm @ Meas	sured Temp.	5.0	5.0 @ 75 °F		@	@ °F		°F	°F @	
Rmf @ Mea	sured Temp.	5.0	@ 75	۰F	@	°F	@	°F	@	°F
Rmc @ Measured Temp.			@	°F	@	°F	@	°F	@	°F
Source Rn	mf Rmc	mea	s							
Rm @ BHT	and the second section is		@	٥F	@	°F	@	°F	@	°F
District Ce. Te. No.	ce Circulation	4.0		Hr		Hr		Hr		Н
Max. Rec		75.8	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	°F		°F		°F		۰F
Van No.	Location	LV-3		1						
Recorded		-	Ihde							
Witnesse	d RV	Victo	or Olyada							

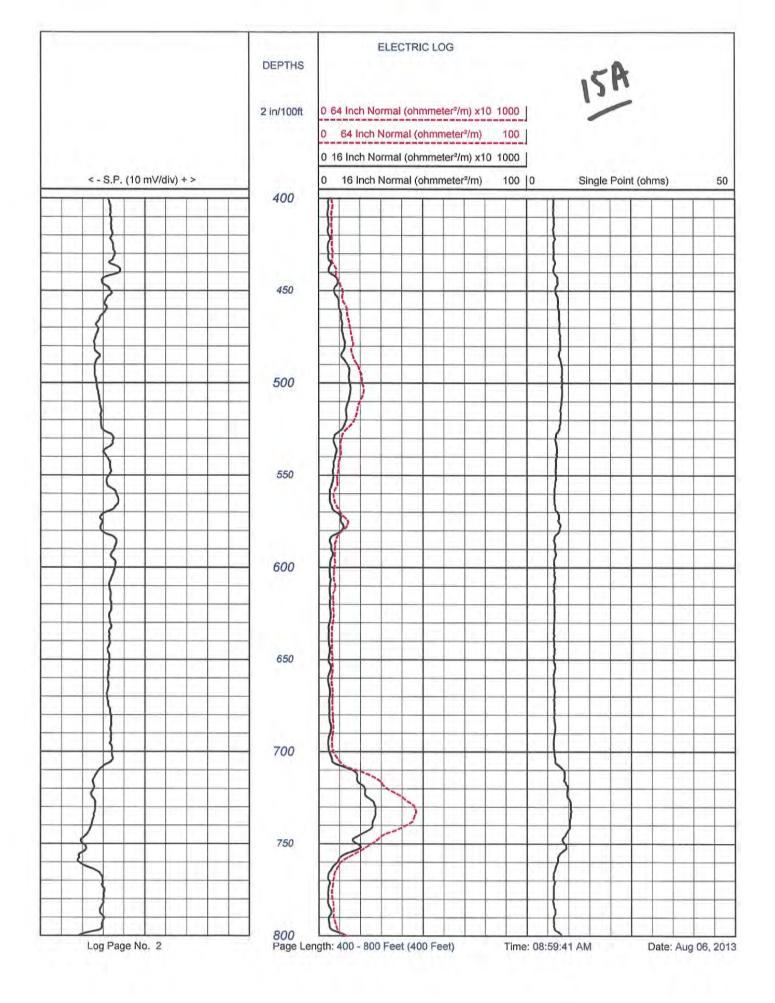




215/21E 15A

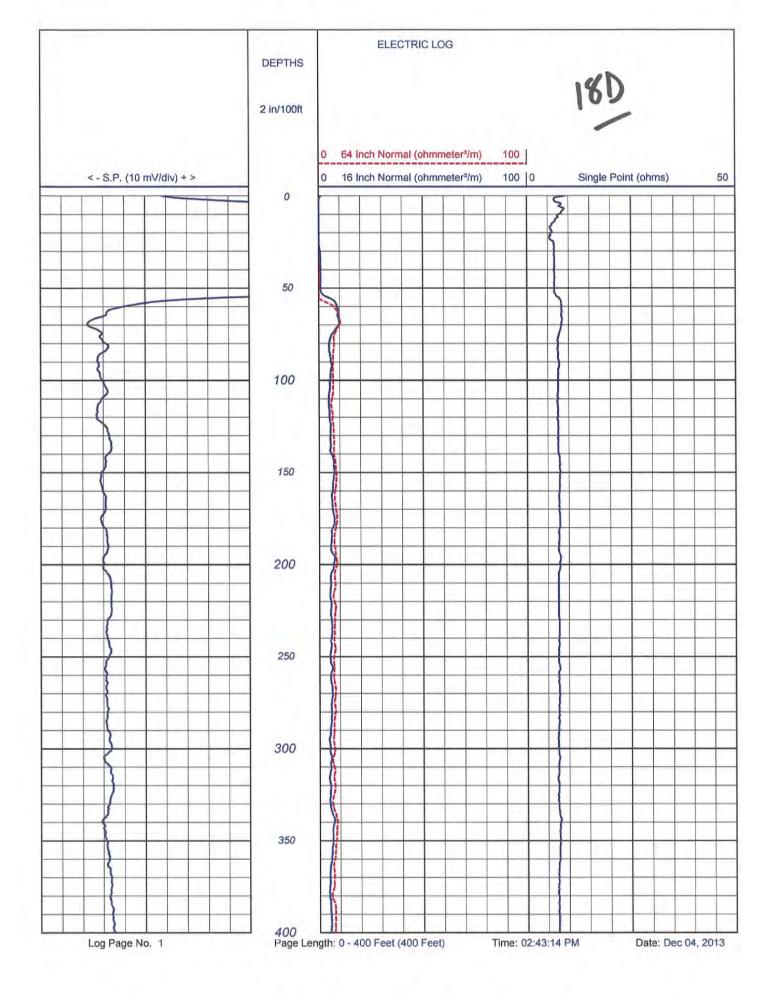
520	1 Woodme				CA 93313 w tractor's Lice			800) 44	5-9914	
			A THE WAY	1	CTRIC		THE PERSON NAMED IN			
FILING I		MPANY)-				
	FIE	LD _	Corcorar	1						_
	STA	ATE _	California COUNTY Kings							
	LOC	ATION: nile South	of Niles a	nd 1:		10000		No	ER SERVICES: ne	
JOB NO 1680	2.			21E_L	AT.: 36° 6 ' 29.1"			ERIDIAN.:_	Mt. Diablo	
Permanent Datum: Ground Level						Elev	AND THE PROPERTY AND ADDRESS OF THE PARTY AND	Ft. Ele	v.: K.B	
	sured From:		d Level		F	. Above	Perm. Datum		D.F	
	Measured Fro		d Level	_		_		- 0	G.L. 196	Ft.
Run O		One		-		_				
Date		Aug. 0	6, 2013							-
Depth-Dri				Ft		Ft Ft		Ft Ft		FI
Depth-Lo		-		Ft		Ft		Ft		FI
	ed Interval	0		Ft		Ft		Ft		FI
Casing-D	ged Interval	32	- 00			-		-	10.4	_
Casing-Lo	100000		In @ 90 In @ 91	Ft	In @	Ft	In @	Ft Ft	In@	F1
Bit Size	oggei	17.5	in @ a i	Ft	In @	Ft	In @	In	In @	In
Time On	Bottom	6:40 A	M					- 27		
Type Flui		Bento	1							
Density	Viscosity	Demo	1			-				
рН	Fluid Loss			ml		ml		ml		m
Source of S	Sample	Tank								
The state of the s	sured Temp.	3.9	@ 75	°F	@	°F	@	°F	@	°F
	sured Temp.	3.5	@ 75	٥F	@	°F	@	°F	@	op.
7.00	asured Temp.		@	°F	@	°F	@	°F	@	۰F
Source Rmf Rmc		meas	Ĭ		Ĭ		Ĭ			
Rm @ BH1			@	°F	@	°F	@	°F	@	°F
	ce Circulation	5.0		Hr	i k	Hr		Hr	. 0	
Max. Rec	. Temp.	N/A		°F		°F		°F		op
Van No.	Location	LV-3	Bflo	1						
Recorded	Ву	Dan II	ide							
Witnesse	d Bv	Victor	Olveda			- 1				

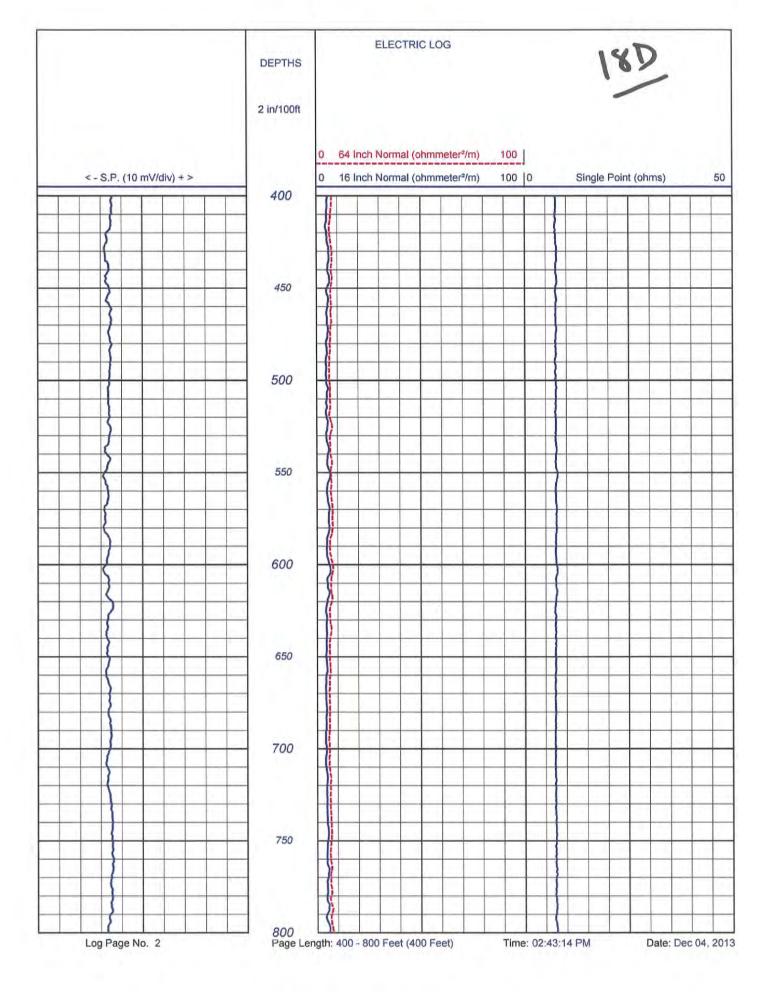




225/22E 18D

					=w	e	len	C	9	
5201 V	Woodmere	Drive	e, Bakersfi	eld, C		ww.wel	lenco.com(80			
			Е	LE	CTRIC I	LOG				
FILING NO.	COM	PANY.								
	COM	PAINT								-
	WELL				_					-
	FIELD		Corcorar	1						-
	STAT	E	California	a	CC	UNTY_	Kings			
	LOCAT					OIVII		Готн	ER SERVICES:	-
					20 ALL			No		
	SW c	orner	of 10th and	Redd	ng Ave.					
JOB NO. 17376	esc. 18	TOMP	22S BOE 2	2F 145	. 36° 01' 16 1"	LONG .	119° 38' 33.1" MER	DIAM	Mt. Diablo	
Permanent I			und Level	LA					v.: K.B	E4
Log Measure	5.7%		und Level				Perm. Datum	. =10	D.F	
Drilling Measure			und Level		-,	ADOVE	rein. Datum		G.L. 182	Ft.
Run	sureu i ion	One							O.L.	
Date			04, 2013	-				_		
Depth-Driller		Dec	. 04, 2015	Ft		Ft		Ft		Ft
Depth-Logge		_	-	Ft		Ft		Ft		Ft
Top Logged I		0	-	Ft		Ft		Ft		Ft
Btm. Logged				Ft		Ft		Ft		Ft
Casing-Drille		32	In @ 50	Ft	In @	Ft	In @	Ft	In @	Ft
Casing-Logg		32	In @ 54	Ft	In @	Ft	In @	Ft	In @	Ft
Bit Size		17 1		In		In		In		In
Time On Bott	tom	1:00	PM	- 1						
Type Fluid In	Hole	Ben	tonite							
Density \	/Iscosity							- 1		
pH F	fluid Loss			mI		ml		ml		m
Source of Samp	ole	Tan	k		- 4					
Rm @ Measure	d Temp.	3.1	@ 75	۰F	@	°F	@	°F	@	°F
Rmf @ Measure	d Temp.	2.8	@ 75	۰F	@	°F	@	°F	@	۰F
Rmc @ Measure	ed Temp.		@	°F	@	°F	@	°F	@	°F
Source Rmf	Rmc	mea	S							
Rm @ BHT		-	@	°F	@	°F	@	°F	@	°F
Time Since C		4.0		Hr		Hr		Hr		Hi
Max. Rec. Te		N/A		°F		°F	1	°F		°F
	ocation	LV-								
Recorded By	1	Dan	Ihde			_				



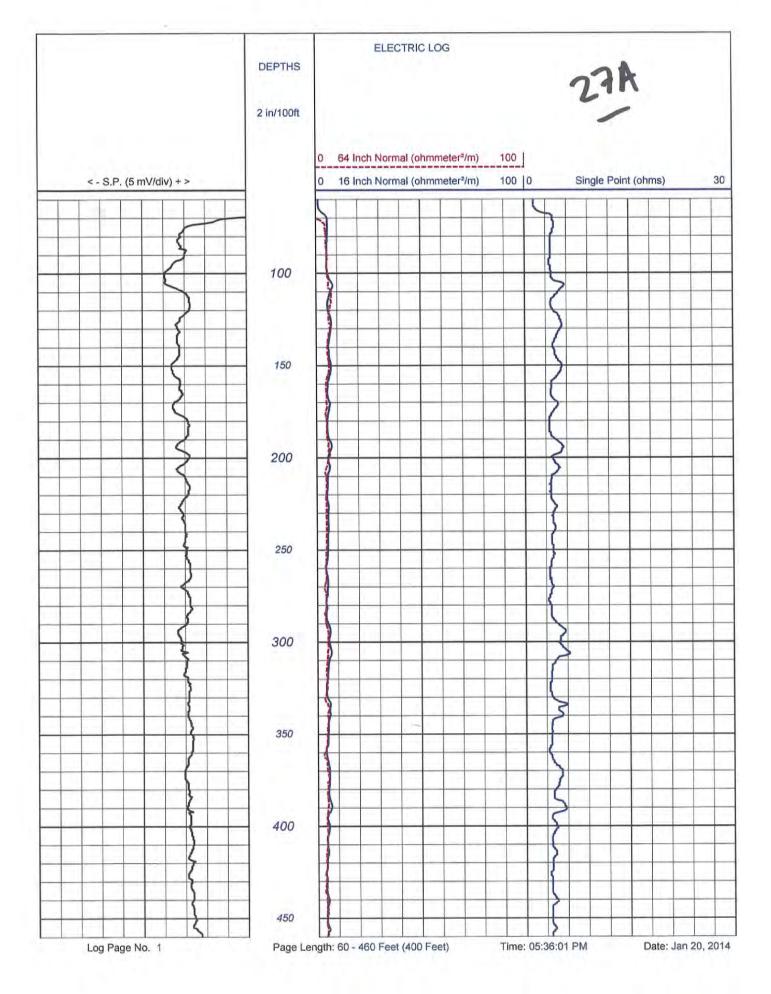


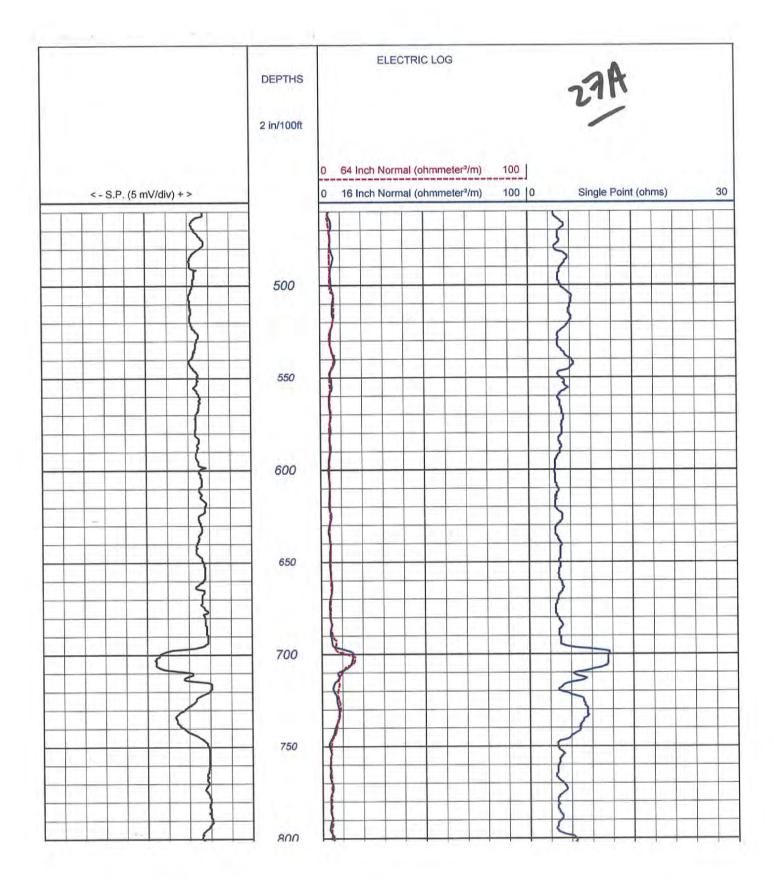
215/21E 27A

_			,			
_	-	el	-	-	-	-
_						
	WW				V	

5201 Woodmere Drive, Bakersfield, CA 93313-- www.welenco.com--(800) 445-9914

020	· vvocamor	Cal	ifornia (Contrac	ctor's Licer	se No. 7	22373	Elak at 62	(4.110)	
			El	LEC	TRIC L	.og				
FILING N	0.	_	-/-	W	A SECTION AND ADDRESS OF THE PARTY OF THE PA					
Job# 273	COM	PANY _						_		-
	WELI									2
	11.30%		tratford							-
	FIELI		1 1 J A			330	All the Control			-
	STAT	E _C	alifornia		co	UNTY	Kings	075		-
	3 Mile		Ävenue	10 on th	ne South sid	e of Puek	ilo.	Noi	ER SERVICES: ne	
JOB NO										
17618	SEC:	TWP:	_ RGE:	LAT.:		LONG.:	МЕ	RIDIAN.:_		
Permanen	t Datum:	Ground							v.: K.B	Ft.
Log Meas	ured From:	Ground	Level		0 Ft.	Above P	erm. Datum		D.F	_Ft.
Drilling M	easured Fron	n: Ground	Level						G.L	_Ft.
Run		One								
Date		Jan. 20	, 2014							
Depth-Drill	ler			Ft		Ft		Ft		Ft
Depth-Log	ger			Ft		Ft		Ft		Ft
Top Logge	ed Interval	60		Ft		Ft		Et		Ft
Btm. Logg	ed Interval			Ft		Ft		Ft		Ft
Casing-Dr	iller	32	n @ 67	Ft	In @	Ft	In @	Ft	In @	Ft
Casing-Lo	gger		n @ 67	Ft	In @	Ft	In @	Ft	In @	Ft
Bit Size		17.5		In		In		In		In
Time On E		15:54		-						
Type Fluid		Water								
Density	Viscosity	N/A	N/A							
рН	Fluid Loss	N/A	N/A	mi		mi		ml		ml
Source of S		Pit	- 7F	-				-		
Rm @ Meas			@ 75 @ 75	°F		°F		°F	@	°F
	sured Temp.			°F	@	°F		°F		°F
	sured Temp.	Meas	@ N/A	°F	@	°F	@		@	
Source Rm			@ -	°F		°F	@	°F	@	°F
Rm @ BHT	e Circulation	4.0	<u>@</u>	Hr	@	Hr	<u>@</u>	Hr	<u>e</u>	Н
Max. Rec.		N/A		°F		°F		°F		°F
Section of the second	Location	L-15	Bfld	-						
Recorded			Jackson			- 1				
Witnessed			Olveda			7.				





Recorded By Witnessed By	Location	Equipment Number	Max. Recorded Temperature	Time Logger on Bottom	Time Circulation Stopped	Rm @ BHT	Source of Rmf / Rmc	Rmc @ Meas. Temp	Rmf @ Meas. Temp	Rm @ Meas. Temp	Source of Sample	pH / Fluid Loss	Density / Viscosity	Type Fluid in Hole	Bit Size	Casing Logger	Casing Driller	Top Log Interval	Bottom Logged Interval	Depth Logger	Depth Driller	Run Number	Date	Log Measured From Drilling Measured From	Permanent Datum	Sec. Twp.	1 MILE SOUTH OF THE INTERSECTION OF REDDING AVE & 10TH AVE. GPS: N36o00.424' W119o38.567'	Location:	County	Field	Well	Company			SURVEY	ACIF
ABREAU	LA.	PS-/			8 HOURS	N/A	MEASURE	NA	9.39 @ 69.1F	9.48 @ 69.1 F	TANK	NA	NA	BENTONITE	17.5°	52"	32" @ 52'	U.				ONE	03/12/2014	G.L. 0		p. Rge.	ERSECTION OF REDDING.		KERN	KETTLEMAN CITY		ly			S	C
																								above perm. dawm	Elevation	,,		0	State	YTK				GAMMA	ELECTRIC LOG	
-		-		-																							NONE	Other Services:	CA				į.	KAY	CLO	1
																								C. July	Elevation	!		es:							G	
All in	iter	inte	etati	ons	are	e op	nd v	ve :	sha	all n	ot, nyo	exc ne	ept	in	the	ca	se o	of g ny i	ros nte	s o	r w eta	rillfu	ıl ne	egliger ade by	nce y an	on o	our part, t	e lia ers, a	ble or	resp	onsib nploy	le fo	r an	ne accuracy y loss, costs ese interpret	dama	ges, or
													_									Co	om	ments	s											

Database File

18120.db

Dataset Pathname **Dataset Creation**

elog Wed Mar 12 15:41:32 2014

Database File
Dataset Pathname
Presentation Format
Dataset Creation

Charted by

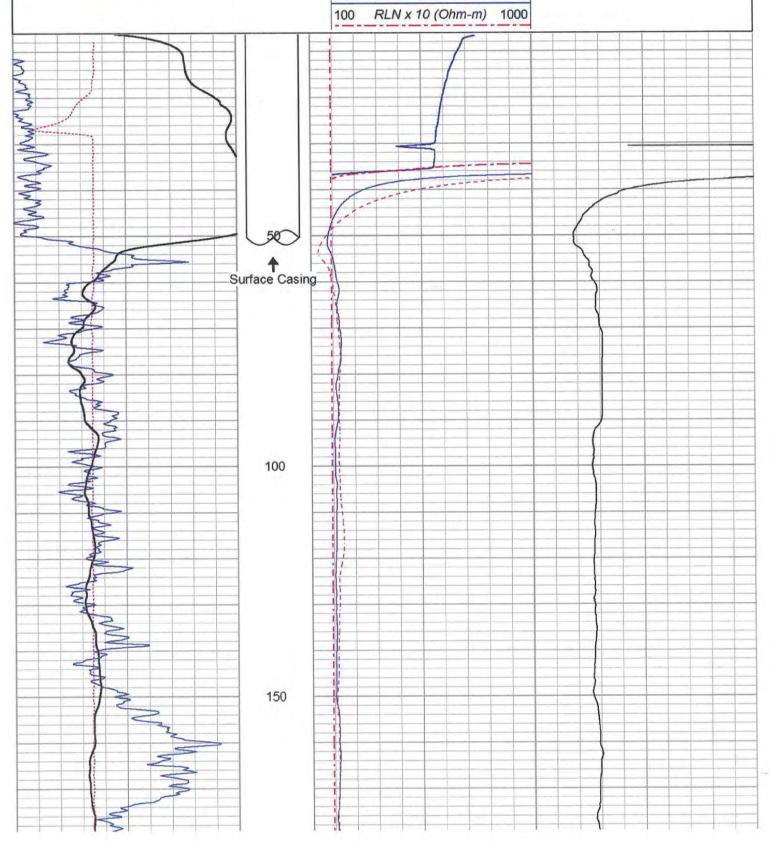
18120.db elog elog

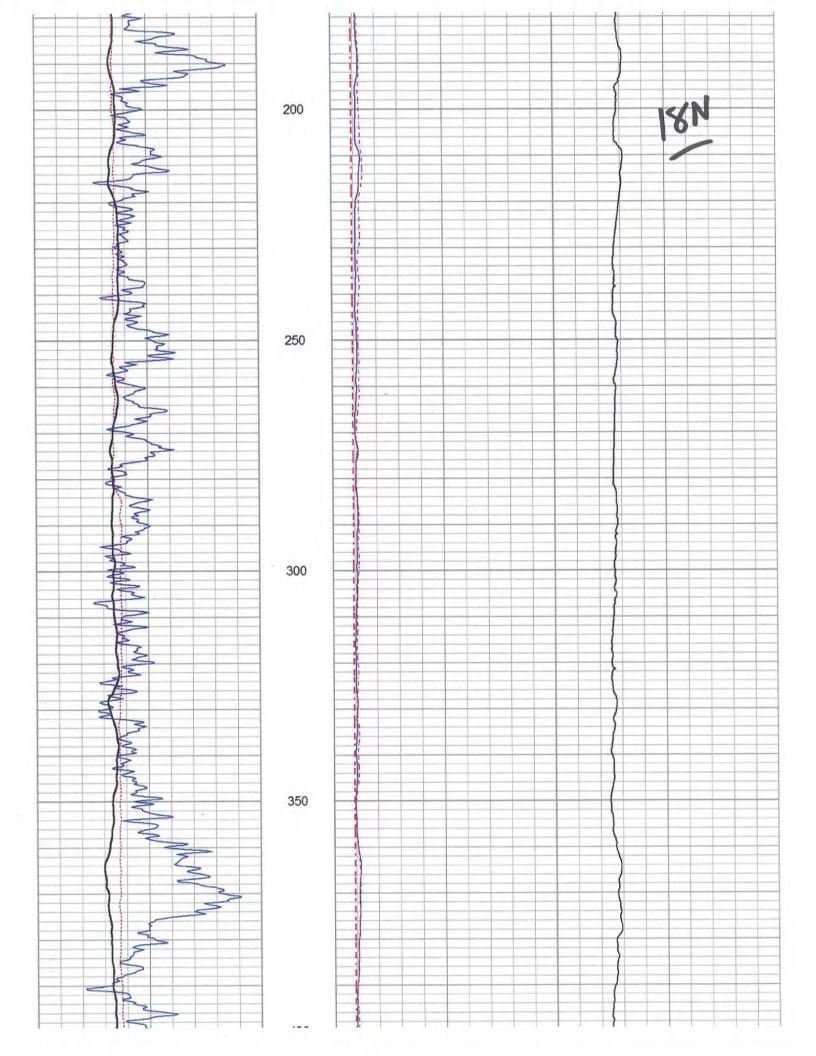
Wed Mar 12 15:41:32 2014 Depth in Feet scaled 1:240

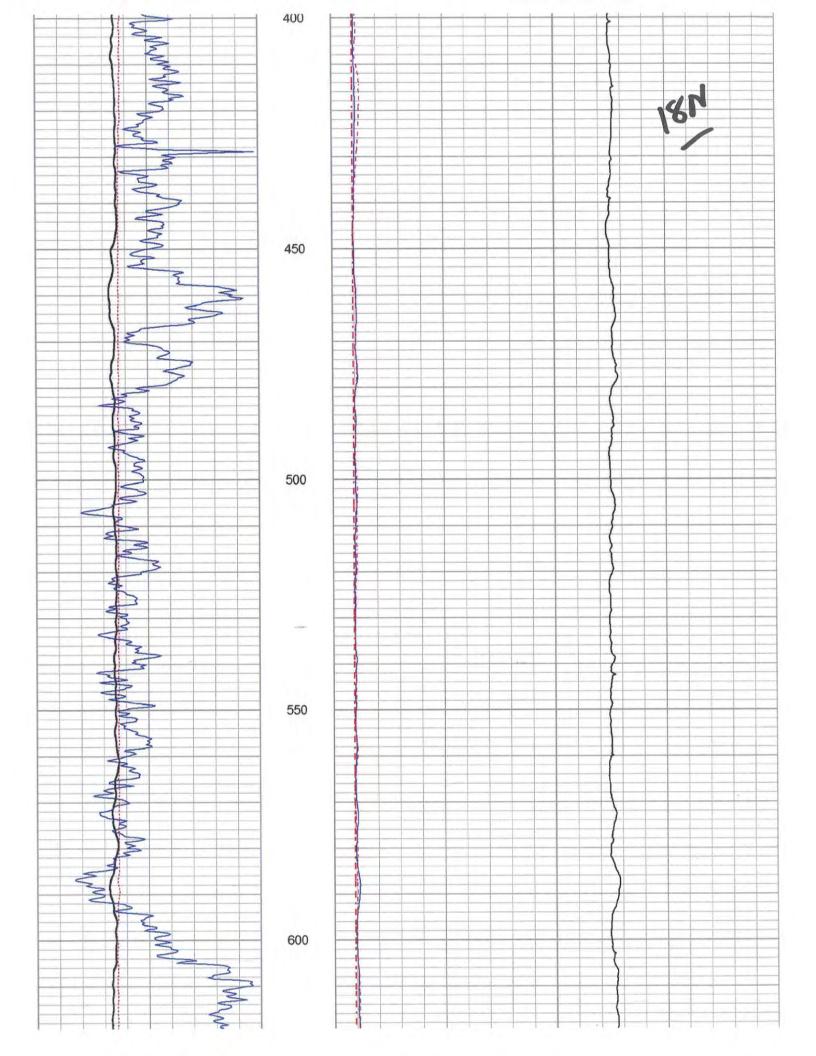


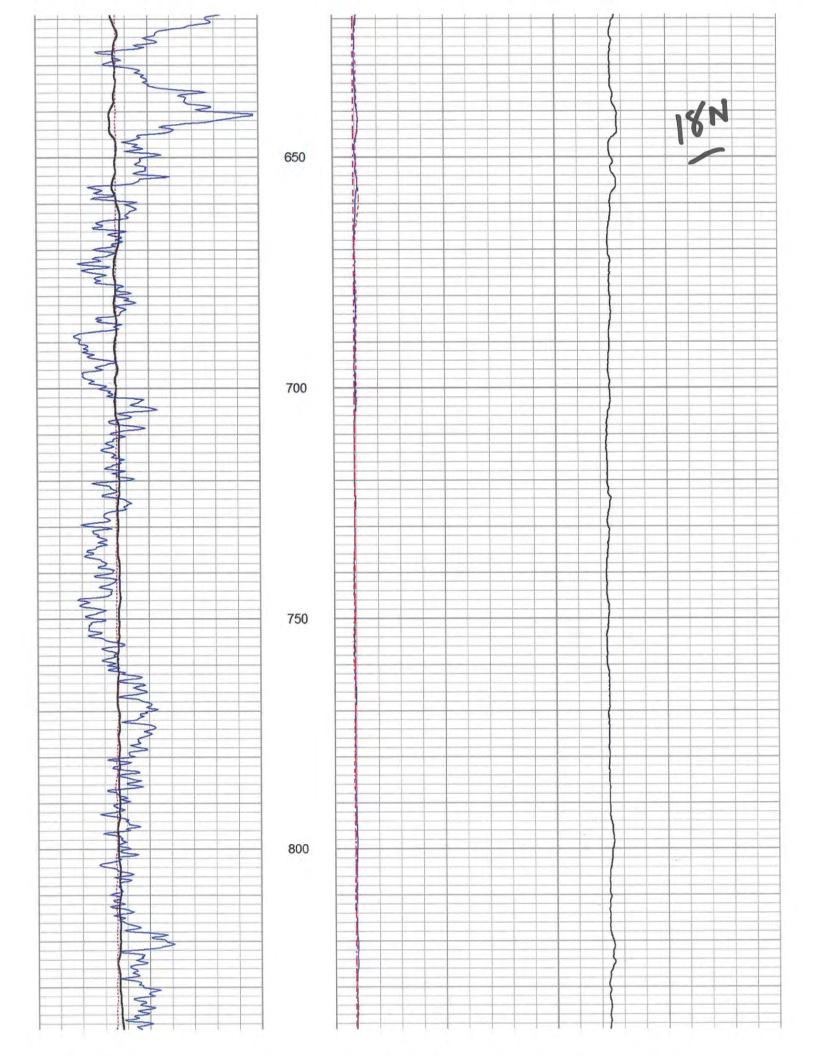
25

-70	SP (mV)	30	0	RSN (Ohm-m)	100	0	SPR (Ohm-m)
0	Line Speed (ft/min)	-100	0	RLN (Ohm-m)	100		
20	Gamma-Ray (GAPI)	80	0	RMF (Ohm-m)	100		
			100	RSN x 10 (Ohm-m)	1000		









Witnessed By	Recorded By	Location	Equipment Number	Max. Recorded Temperature	Time Logger on Bottom	Time Circulation Stopped	Rm @ BHT	Source of Rmf / Rmc	Rmc @ Meas. Temp	Rmf @ Meas. Temp	Rm @ Meas. Temp	Source of Sample	pH / Fluid Loss	Density / Viscosity	Type Fluid in Hole	Bit Size	Casing Logger	Casing Driller	Top Log Interval	Bottom Logged Interval	Depth Logger	Depth Driller	Run Number	Date	Drilling Measured From	Permanent Datum	Sec.	SOUTH SIDE OF PUEBLO AVE 3 MILES WEST OF 10TH AVE GPS: N360 4.762' W1190 41.845'	Location:		File No.			18206		SURV	BAC
			er	emperature	ottom	Stopped		mc.	mp	np	np	20		,	w					terval					From	7	Twp.	PUEBLO A 2' W1190 4		County	Field		Well	Company		m -	П
1 3	Ī	B	P		21	17	N/A	M	NA	4.1	4,	1/	NA	N/A	Q	17	54'	32	25'		_		0	04	GL.	G (C	P.	VE 3 MILE 11.845		KINGS	5	3	÷	Ŋ		SA	,
1 6	HDE	BFL	PS-5	A	21:45	17:00	Α	MEAS	A	4.64 @ 67F	4,9 @ 67F	TANK	A	A	QUICK GEL	17 1/2"	+-	32" @ 54'	0,1				ONE	04-16-2014		Q		S WEST C		GS	CORCORAIN						
																											Rge.	F 10TH A			MIN	2					
																										above perm. datum		Æ		State						ELECTRIC LOG GAMMA RAY	
								-																		datum		NONE	Other Services	e CA						LECTRIC LOG	
																									G.F.		Flowation		Prices:							₹ G	
<	<<<	< F	old	He	re	>>>																															
of	an	ny i	nte	rpr	eta	tion	, ai	nd	we	sha	ill n	ot, nyo	exc	res	in ulti	the	cas	se o	of g	ros nte	s o	r wi etat	llfu tior	l ne	eglige ade b	ence by ar	on c	our part, l our offic	oe lia ers, a	ble o	r res	pons empl	sible	e for ar	y loss,	racy or correct costs, damages rpretations are	s, or
exp	ei	156	511	icu	ne	u Oi	SU	ISIA	irie	u b	y ai																	our curre					Oye	.cs. 111	ose inte	pretations are	

Database File Dataset Pathname

18206.db

elog Wed Apr 16 21:47:51 2014 **Dataset Creation**

Database File Dataset Pathname Presentation Format

18206.db elog elog

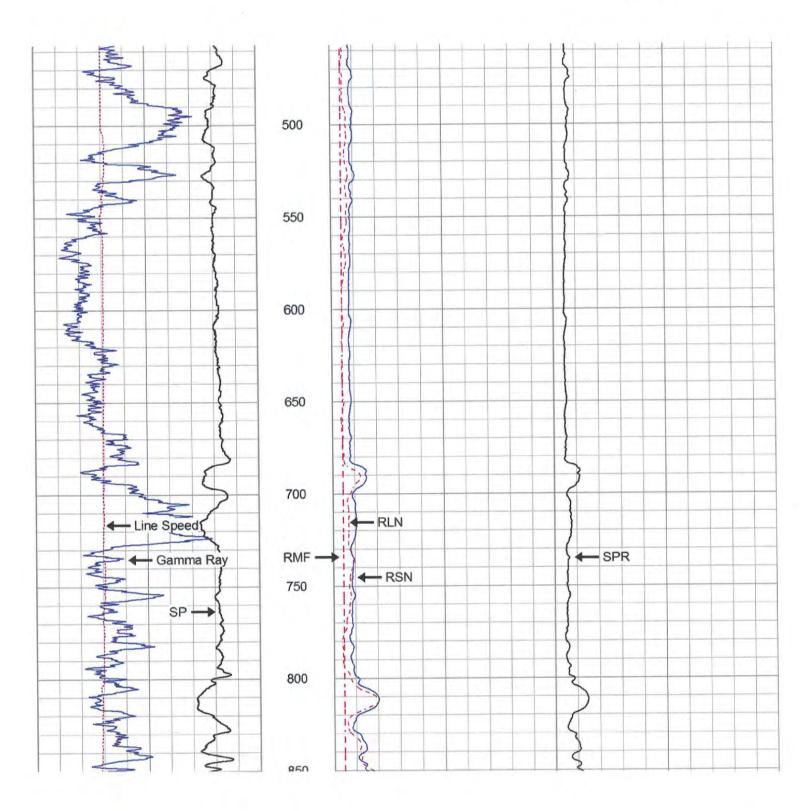
Presentation Format
Dataset Creation
Charted by

elog
Wed Apr 16 21:47:51 2014
Depth in Feet scaled 1:600



10	SP (mV)	10		0		RS	N (O	hm-m)		100	0		SP	R (C	hm-	m)		10
	Line Speed (ft/min)	100		0		RLI	N (OI	hm-m)		100								
5	Gamma-Ray (GAPI)	175		0				hm-m)		100	1							
				1	100			0 (Ohr		1000								
					100			0 (Ohr			-							
***				1 .							1		_			-	_	-
MAN MAN	,						77.1				-	-	-	\vdash				=
Š	=======================================		-	1							(
	=			-1														
3																		
	=																	
-	5 }																	
1			100	1										2				_
	*)			1						(ļ.,					4
4					-	-		_	1		-}-	-		-				-
-				-11		-			-		-		-	-	-		-	-
+	1			13		-		-	-		++-	-	-	-				+
+	3		150	1		-	-		+		1	-	-	-				+
-		-		1	5				+	-	1	-						-
+	My My My	1		1							11		1	+				
	\$	2		+							1							\forall
+	3 /			17	}													
\top		5	200	1														
-	1																	
				15	}													
	3			17														
	*	-	250	1							11							
	JANA JANA)	200	1/1							11							
-	3	}		li V		-			-		11	_	4					_
	1	1		4	(-	-	1	-	-	-				-
+	3			11	1			-	-		+	-	-	+	-			-
+	3		300	1	}	+			1		1	-						-
+	3			1							+		-	-	-			
t		5		Ť	\	1					5			1				_
				1	1													
T			250	17							11							
1			350	5														
	3			i,														
	5	3		11/14	1													
		}		1	(1							
-	3	}	400	i	(1			-	-			
	24	}		į,	}				-		1		-	-				_
-	1	}		1					-				-	-		-		
+	***	5		1	}	-			-		}			-		-		+
-		}		3	}	-			+		-		+	-		-		-
+	-		450	1	1						15		-	-				-





^ C T	→	6.0	23	15	s, or	
SURVI	EYS	ELEC: GAM	ELECTRIC LOG GAMMA RAY	u)	iracy or correctn costs, damages, rpretations are	
					loss, o	
Job No. 18395 Com	Company				for any	
Well					nsible ploye	
_	CORCORAN	DRAN			respo or em	
County	nty KINGS	State	te CA		ole or gents	
Location:			Other Services	es:	e liat ers, aç	
SOUTH SIDE OF PUEBLO AVE 4 MILES WEST OF 10TH AVE GPS: N360 4.763' W1190 42.919'	BLO AVE 4 MILES WE 190 42.919'	ST OF 10TH AVE	NONE		ır part, b our office	
Sec.	Twp.	Rge.			on ou	
Permanent Datum Log Measured From Drilling Measured From	6 6 6 6 7	Elevation 0' above perm. datum		Elevation K.B. G.L.	gligence o	ments
Date	06-07-2014	014			l ne ma	mr
Run Number	ONE				illfu atior	Co
Depth Driller	1				or w	
Bottom Logged Interval					ros	
Top Log Interval					of g ny i	
Casing Driller	32" @ 54'	4'			m a	
Casing Logger	54				e ca	
Type Fluid in Hole	QUICK GEL	GEL			in th	
Density / Viscosity	NA				ept res	
pH / Fluid Loss	NA				excone	
Rm @ Meas Temp	8.63 @ 80.9F	80.9F			not	
Rmf @ Meas. Temp	8.49 @ 80.9F	80.9F			shal	
Rmc @ Meas. Temp	NA				ve s	
Source of Rmf / Rmc	MEAS				nd v	
Rm @ BHT					e op	
Time Circulation Stopped	ă.				are	
Time Logger on Bottom					ions	
Max. Recorded Temperature					etat	
Location	BFL				y in	
Recorded By	ABREAU	U			Il int	
Witnessed By	1				(

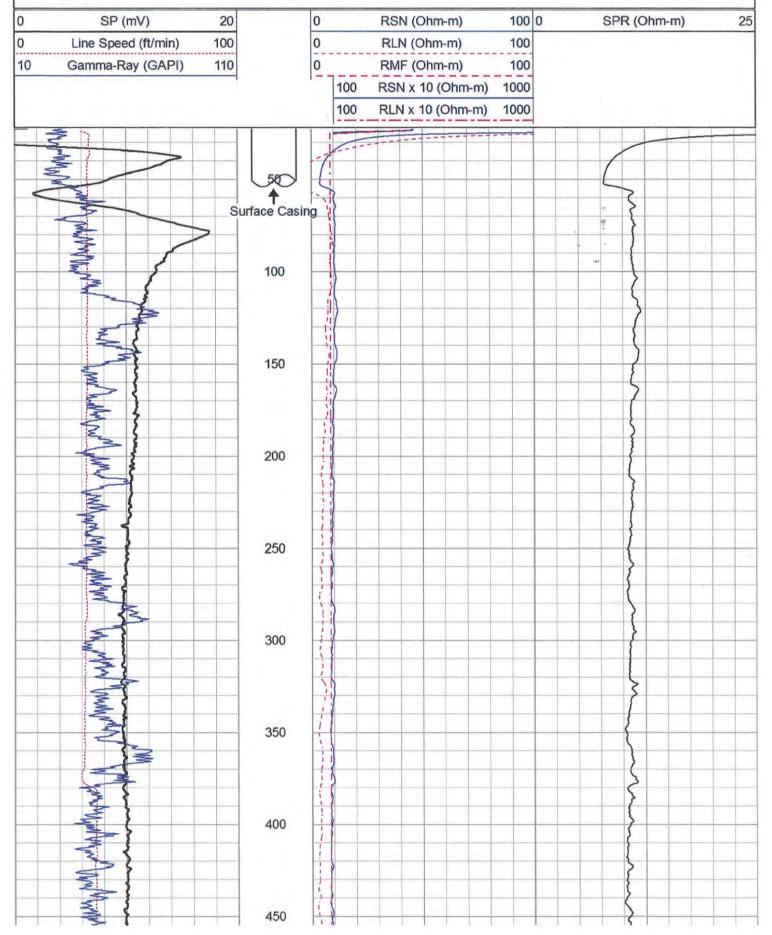
Database File 18395.db

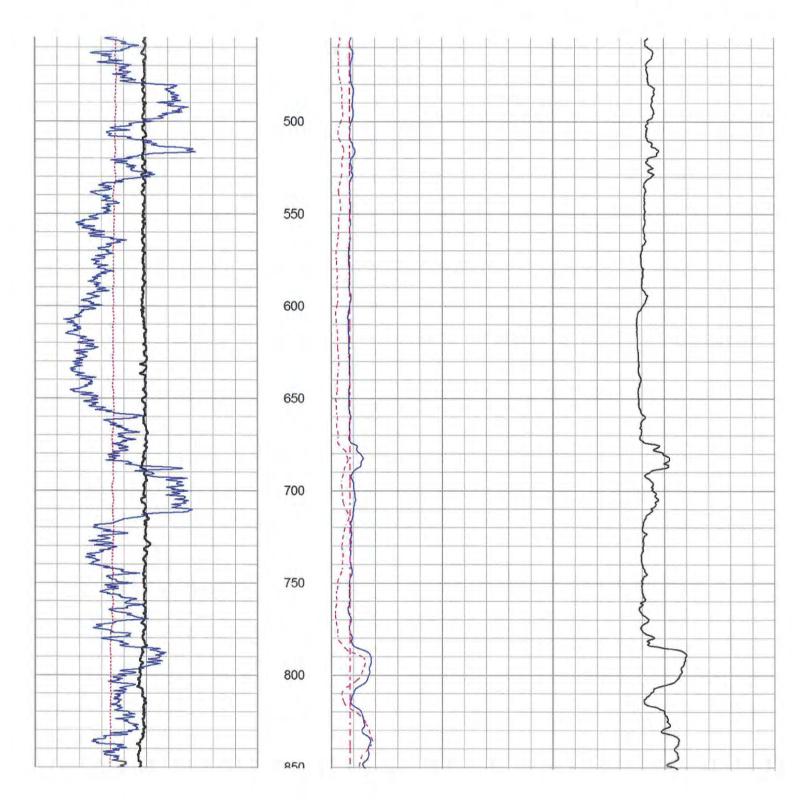
Dataset Pathname elog Dataset Creation Sat Jun 07 09:14:08 2014

Database File Dataset Pathname Presentation Format 18395.db elog.1 elog

Dataset Creation Charted by Sat Jun 07 12:06:02 2014 Depth in Feet scaled 1:600







Recorded By	Location	Equipment Number	Max. Recorded Temperature	Time Logger on Bottom	Time Circulation Stopped	Rm @ BHT	Source of Rmf / Rmc	Rmc @ Meas. Temp	Rmf @ Meas. Temp	Rm @ Meas. Temp	Source of Sample	pH / Fluid Loss	Density / Viscosity	Type Fluid in Hole	Bit Size	Casing Logger	Casing Driller	Top Log Interval	Bottom Logged Interval	Denth Logger	Depth Driller	Run Number	Date	Drilling Measured From	Permanent Datum	Sec.	ON SOUTH SIDE OF PUEBLO AVE. 5 MILES WEST OF 10TH AVE GPS: N 36o 4.751' W 117o 43.970'	Location:		File No.		18567	Job No.		_	PA
		ber	Temperature	Bottom	Stopped		Rmc	emp	amp	emp	Ф		Ŋ	е					nterval							Tw	E OF PUEBLO		County	Field	Well	Company			VEY	CIFI
SCHUN	2	PS-7	N/A	1345	0700	NA	MEASURE	NA	2.32 @ 88.6F	2.61 @ 88.6F	TANK	NA	NA	BENTONITE	17.5"	72'	8	25'				ONE	07-26-2014	G.L.	G.L.		3.970'		KINGS	CORCORAN	i	Y			S	ဂ
SCHUMACHER							JRE		88.6F	88.6F				NITE			72'						2014	Ç.	2	Rge	S WEST OF			ORAN						
																								above perm. datum	Elevation		10TH AVE		State		18				ELEC.	
																								, qatum	datum		NONE	Other Services	e CA					GAMMA-RAY	ECTRIC LOG	
																								(C) (C)	Elevation			vices:						~	ഒ	1
<<	< F	old	Hei	re>	*>>															_				_	_	L,				_	_	_				_
VII in	terp	oret inte	atio	ns etat	are	an	d w	e s	hal	ll no	ot, e	exce ne r	ept esu	in ti	he d	om	e o	f gro y in	oss terp	or	will	ful on	ne ma	gliger ade by	nce y an	on or	ur part, t	e lial ers, a	ble or gents	resp or e	onsib mploy	e for	any	accuracy or loss, costs, do e interpretation	amage	es, or
	_		_	_	_	_	_	-	_	_	-	_	_	_	_	_	_		_	-	-	COL	mn	nents		-				_	_					

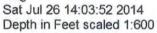
Database File Dataset Pathname

18567.db

Dataset Creation

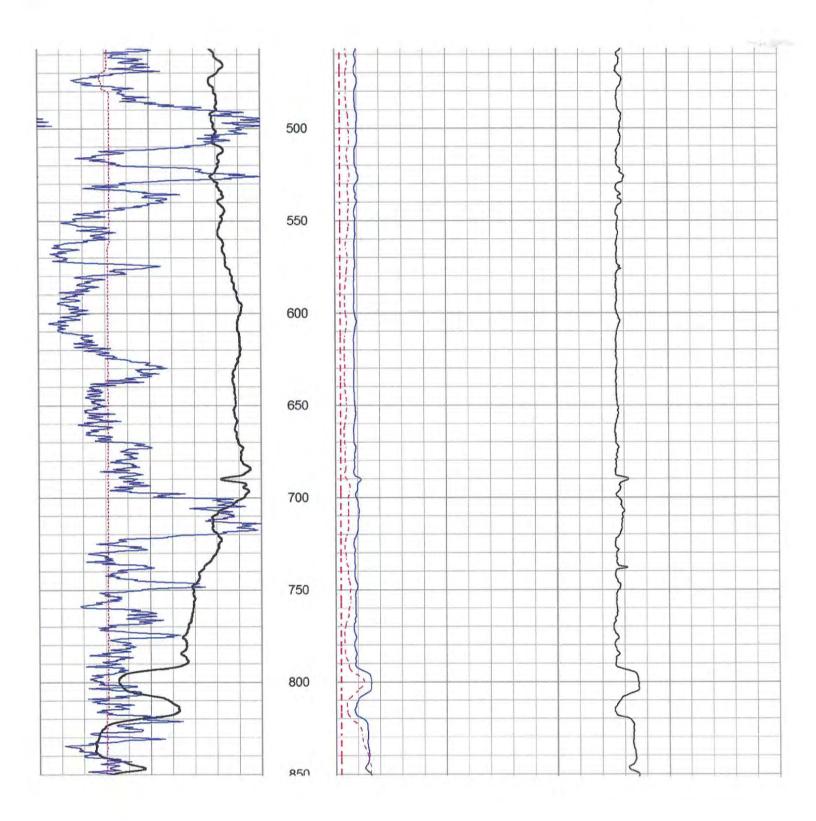
elog Sat Jul 26 14:03:52 2014 Database File 18567.db Dataset Pathname elog Presentation Format elog

Dataset Creation Sat Jul 26 Charted by Depth in Fe





-110	SP (mV)	-60	0	RSN (Ohm-m)	100 0	SPR (Ohm-m)	2
)	Line Speed (ft/min)	-100	0	RLN (Ohm-m)	100		
0	Gamma-Ray (GAPI)	150	0	RMF (Ohm-m)	100		
			100	RSN x 10 (Ohm-m)	1000		
			100	RLN x 10 (Ohm-m)	1000		
			100	KLIV X TO (OTITI-III)	1000		
		Mary State of the					
77		=	-				++
-		50	7		-		+
		=					-
-			1				+
-	= 5	Surface Casir	ng			3	+++
-						++}	+++
	= 1	100	11				+++
			i \			}	
-			1			3	
			11/				
	-						
		150	!!!			1 }	
			1 1				
			! !/				
	}						
		200	; ;			}	
		200	13			1	
			! ((
						{	
						}	
	7	250	1 il			}	
	- {		il			1 1	
-			1 ;)			1	
_	= 3		! }}				
	3	300	11			1	-
-						\$	-
-	= {						-
	7						-
			Ti			1 1	+++
		350	17/				+++
	37						-
-							+++
-			115				-
		1,0	111			1 2	
	}	400				1 (
1							
						1 }	
	1		15			1 1 3	
		450	1::(1



Witnessed By	Recorded By	Location	Equipment Number	Max. Recorded Temperature	Time Logger on Bottom	Time Circulation Stopped	Rm @ BHT	Source of Rmf / Rmc	Rmc @ Meas. Temp	Rmf @ Meas. Temp	Rm @ Meas. Temp	Source of Sample	pH / Fluid Loss	Density / Viscosity	Type Fluid in Hole	Bit Size	Casing Logger	Casing Driller	Top Log Interval	Bottom Logged Interval	Depth Logger	Depth Driller	Run Number	Date	Permanent Datum Log Measured From Drilling Measured From	Sec.	ON SOUTH SIDE GPS: N 360 04.	Location:		File No		18745	Job No.	Ī	SUF	
			ber	emperature	Bottom	Stopped		Rmc	dwe	mp	mp	е		y	е					nterval					m From	Twi	E OF PUEBL 765' W 119 4		County	Field	Well	Company			URVEYS	
	60	_	T.	7	N2	(2)	7	7	7		N		7	7	Е	_	7	(4)	N					0	er er	0.	O AVE. 6		<u>~</u>	00		Į,		ш	s c	
1	SCHUMACHER	A	PS-1	NA	2415	5 HRS	N/A	MEASURE	N/A	2.16 @ 77F	2.40 @ 77F	TANK	NA	N/A	BENTONITE	17.5"	72'	32 @ 72'	25'				ONE	09-21-2014	O,	Rge	ON SOUTH SIDE OF PUEBLO AVE. 6 MILES WEST OF 10TH AVE. GPS: N 36o 04.765' W 119 43.970'		KINGS	CORCORAN						
																									Elevation above perm. datum	œ.	10TH AVE.		State					GAMMA-RAY	ELECTRIC LOG	
																									datum		NONE	Other Services						/A-R	RICL	
																									O.D.R.	Florida		ervices:	P					4	G	
	<<<	< F	old	He	re :	>>>																				_							_			
O	far	ny i	nte	rpre	etat	tion	, ar	nd v	ve :	sha	II n	ot,	exc	res	t in i	the	cas	se d	of gr	ros	s o	r w eta	illfu tior	l ne	egligence	on o	our part, our offic	be lia ers, a	ble or	resp	onsibl nploy	e for a	any loss	ccuracy or s, costs, d nterpretati	amages,	or
				_	_						_				2.03		-	-							ments		3,10,2,04									

Database File

18745.db

Dataset Pathname elog
Dataset Creation Sun Sep 21 00:48:30 2014

Database File Dataset Pathname Presentation Format

18745.db elog elog

Dataset Creation Charted by elog Sun Sep 21 00:48:30 2014 Depth in Feet scaled 1:600



0	SP (mV)	80	0	RSN (Ohm-m)	100	10	SPR (Ohm-m)	3
	Line Speed (ft/min)	-100	0	RLN (Ohm-m)	100			
0	Gamma-Ray (GAPI)	140	0	RMF (Ohm-m)	100			
			10	00 RSN x 10 (Ohm-m)		1		
			10	00 RLN x 10 (Ohm-m)	1000			
*******		3	1					
		*			===			
4		50	1					_
		50	1					-
								-
-		Surface Casin	1			3		-
-	2 3	Surface Casir	ig ,			{		
E	7	100	11					-
-	> \					}		
west.			1			7		-
-			1			/		
-	-							-
-		150	<u>i i)</u>			->		-
-	3		1 1			+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$		
-	-		1)			}		
-	3		1					
-	3 (1 3			15		-
-	-	200	1/			1		
-		Salah kalang kalanggan	i i			1		
-						1		
1	-					1		
-	-		1			1		
-	-	250	111			}		
-	1		1			-		
-			1 /			}		
	3		11			15		
1	}		111					
_	5	300						
1	3		1 1			13		
-	5		1 1			1		-
-			14			1		
-			1			1		
-	=	350	11/			1		
-			11			1		
-	1 1 3		1 1			}		-
-						15		-
-	3 {		111			1 8		
-	3 7	400				1		
E	3)		111			15		
-	3-1		11			1		
1	3-1		111			1 >		
-	E					1 3		
		450				1 7		

